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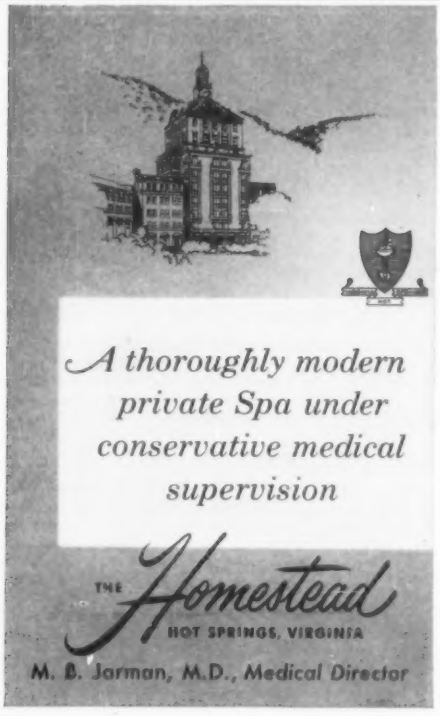
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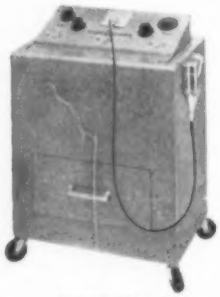

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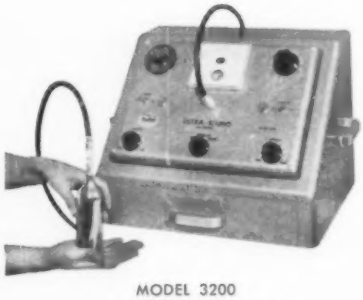

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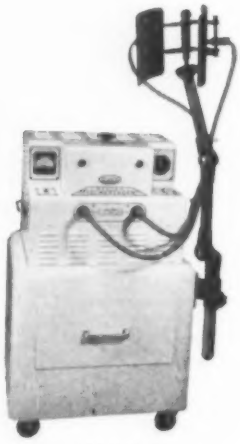

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Usefulness of Glossopharyngeal Breathing from the Viewpoint of the Patient

Clarence W. Dail, M.D.
Leonard V. Wendland, Ph.D.
and
John E. Affeldt, M.D.
Los Angeles

Glossopharyngeal breathing, as has been described in previous reports,[1, 2] is a function acquired as a substitute for weakened or paralyzed muscles of breathing. The structures of the mouth, pharynx, and the larynx act as an air pump to ventilate the lungs. In some cases this function is accidentally acquired by patients who have full or partial respiratory muscle paralysis during the extreme effort put forth to breathe during the time respiratory equipment is not used. This we have found to be true in 8 of the 150 patients who have learned glossopharyngeal breathing. Some patients have learned by observing other patients; most of them, however, have developed the technic by a concerted teaching program.

As we have developed improved teaching methods[3] we have become more aware of the importance of patient motivation. The significance of this is no doubt greater when the patient may rely with confidence on artificial respiration. It may appear obvious to the hospital staff that the patient should learn glossopharyngeal breathing, providing he has adequate glossopharyngeal muscle strength; however, the patient may make little or no progress in learning even though glossopharyngeal breathing instruction is indicated. This may result from the patient's attitude toward the skill to be learned, which is in accord with well-known general principles of learning theory and has been confirmed repeatedly in patients under observation. The purpose of the survey reported here is to understand more fully the patient's attitude toward glossopharyngeal breathing and thereby improve the teaching methods.

Method of Study

We decided to study the attitude of patients by first analyzing the type of statements patients made when asked to name some of the desirable and undesirable things they had heard about glossopharyngeal breathing. Secondly, without the patient's knowledge, each statement was assigned a numerical value, expressing the degree of positive or negative attitude. Thirdly, patients were given a list of the statements and were instructed to check each statement with which they could agree. Finally, the numerical values thus obtained were used as an aid in making comparisons.

The statements for the check list were obtained directly from the patients so as to avoid any bias of the medical staff. One hundred fifty-seven specific verbatim statements were obtained. One hundred nine of these were of a desirable nature; the rest indicated undesirable features. As was anticipated, many statements were either identical or were so similar that it seemed advisable to delete them. The final list consisted of 53 statements.

These statements were submitted to 59 of the professional staff of the hospital. They were requested to check each of the statements at a point on a seven-point equal-interval scale reflecting their judgment of the varying degrees of negative or positive attitudes. On the basis of these cumulative judgments, and using

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From the Rancho Los Amigos Respiratory Center for Poliomyelitis, Hondo, Calif., and the Departments of Physical Medicine and Internal Medicine, College of Medical Evangelists.
The Respiratory Center is aided by an annual grant from the National Foundation for Infantile Paralysis, Inc.

a modified Thurstone's method[4] for attitude scale construction, each statement was assigned a quantitative positive or negative value. By this means 20 statements were found to be of a negative nature and 33 were positive, the scale spread being from +2.5 for a strongly positive statement to −2.4 for one strongly negative. There were also statements of a rather neutral nature giving a score near zero. Examples are listed in table 1.

Table 1: Representative Statements of Relatively Positive, Neutral, and Negative Nature.

Statement	Score
"Important in times of emergency."	+2.5
"Get more confidence in self."	+2.2
"Is not involuntary."	−0.1
"I really can't say anything bad about it." .	−0.4
"Makes you look like a frog."	−2.1
"Looks bad, I like neck breathing."	−2.4

Check lists of these statements were given to 50 patients at random. They were asked to indicate with which statements they could agree and to disregard all others. It should be remembered that some patients needed assistance in marking the sheets because of inability to write, and therefore their spontaneous responses might have been somewhat inhibited.

Of the 50 patients surveyed, 23 had learned glossopharyngeal breathing, 15 were under instruction, and 12 did not know how to do this breathing nor was it indicated medically. These three groups were designated as A, B, and C, respectively. All of these patients were conversant with the procedure since all patients at this hospital have an opportunity to observe the use of glossopharyngeal breathing.

The statements listed on the check list can be segregated under several categories. The positive or negative nature of each category can be expressed by averaging the assigned values of the statements making up each category (table 2). One can, in a like manner, determine how any individual or group responded to the different categories of statements.

Findings

The statements submitted by the patients and listed in the check list were classified into six categories. With one exception all statements pertaining to rehabilitation, security and safety, treatment, and body functions were of a positive nature. Most of the statements pertaining to appearance and technic were of a negative nature.

The strong urge of patients to make progress toward a more normal manner of living is indicated by the high average score of the statements listed under rehabilitation. The average score value of +2.2 (table 2) is obtained by averaging the scores of the seven statements that fall in this category. Since the different statements were not checked by all of the patients, a corresponding drop resulted in the average score obtained by groups A, B, and C.

This study indicates that glossopharyngeal breathing has usefulness for patients in the following specific ways:

Table 2: Patient Scores According to Statement Categories and Patient Groupings.

No.	Statement Categories	No. of Statements	Average Score of all Statements in each Category	Patient Groups A Learned GPB 23 pts.	B Learning GPB 15 pts.	C Not Indicated 12 pts.
1.	Rehabilitation	7	+2.2	+1.7	+1.9	+1.6
2.	Security	10	+2.2	+1.7	+1.7	+1.8
3.	Treatment	6	+1.9	+1.5	+1.1	+1.1
4.	Body Functions	9	+1.3	+1.0	+1.0	+0.8
5.	Appearance	12	−1.0	+0.05	−0.05	+0.02
6.	Technic	9	−1.1	−0.4	−0.5	−0.3
	Total	53	Over-all Average:	+1.35	+1.32	+1.57

Glossopharyngeal breathing makes more extensive rehabilitation possible: The fact that patients recognize the importance of glossopharyngeal breathing in rehabilitation is emphasized by the nature of the following statements:

1. "Get somewhere without equipment — much easier for the family."
2. "Helps those without tolerance to become free of equipment."
3. "Can lead a more normal life."
4. "Can be on a more active program — able to leave ward."
5. "Allows patient more activity areas."
6. "Can free people from tank respirator."
7. "When walking, for extra air."

Observe in table 2 that the average scores for the different groups are approximately the same.

Security is another important need met by glossopharyngeal breathing: No patients denied the safety feature of glossopharyngeal breathing. The 10 statements included in this category are as follows:

1. "Can breathe if power failure."
2. "Get more confidence in self."
3. "More security in emergency situations."
4. "Important in times of emergency, that is, power failure."
5. "Gives one security and independence."
6. "Don't need to rely on equipment."
7. "Family not afraid to take you places."
8. "Easier to relax when no one around."
9. "Never forget it once learned."
10. "Those that need it say, 'Thank God'."

The ability to do glossopharyngeal breathing has therapeutic values: The statements relating to treatment and prevention of complications were also rated strongly positive by the judges. From our observations it would appear that patients who are learning glossopharyngeal breathing and those who do not know how to use it do not realize its values at this point as much as those who are able to use it. The statements included in this category are:

1. "Helps in coughing."
2. "Aids in coughing up mucus."
3. "Helps stretch chest to get mucus up."
4. "Aids in prevention of respiratory infections of chest."
5. "Increases strength of diaphragm."
6. "Helps to stretch upper chest."

Normal body function is facilitated with glossopharyngeal breathing: The statements listed under bodily function demonstrate this appreciation of the patient. Specific bodily functions aided are breathing and talking. Statements are as follows:

1. "Difficult to eat with it."
2. "Do not get as tired."
3. "Good way of breathing if have no other way."
4. "Increase vital capacity by supplementing diaphragm."
5. "Can yell louder."
6. "Helps when short of air."
7. "Good if you can't get your breath."
8. "Free from shell so chest doesn't hurt."
9. "Gets tracheostomy closed earlier."

Glossopharyngeal breathing has cosmetic drawbacks: One would expect the patients to react to the appearance of the procedure of glossopharyngeal breathing. Table 2 indicates that the average score of the three groups is just about neutral. Analysis of the individual statements in this category indicates that most of the statements are negative. Few patients, however, agreed with the negative statements, while most of the patients agreed with the last two statements in this category, listed below, which are strongly positive. This perhaps emphasizes the observation that even though glossopharyngeal breathing has definite cosmetic disadvantages, its advantages appear to be greater. The following are the statements given by the patients:

1. "Feel that in some people it looks unsightly."
2. "Makes you look like a frog."
3. "Doesn't look as good as normal or neck breathing."
4. "Looks like a goldfish."
5. "Wife says, 'Looks horrid'."

6. "Looks like sipping milk from a saucer."
7. "Looks funny."
8. "Looks bad, I like neck breathing."
9. "Never heard anything undesirable about glossopharyngeal breathing."
10. "I really can't say anything bad about it."
11. "Can dress up if don't have to wear shell."
12. "Can get rid of ugly 'trach'."

Statements 9 and 10 were essentially neutral statements. Statements 2 and 5 were checked only twice.

Some patients encounter difficulties in learning glossopharyngeal breathing: The statements pertaining to technic were all of a negative nature. One would expect this for it often takes months of hard work to learn the basic method, and then more time to build up its effective use. The throat and larynx may become irritated by the unusual activity required in this method of breathing. If the muscles of the throat and larynx are weakened from the disease, the patient may never be able to breathe by this method more than 20 or 30 minutes. The following are the statements given by the patients:

1. "If 'trach' leaks, do all work for nothing."
2. "Lots of work."
3. "Hard to learn, takes a long time for some."
4. "Hurts to cough with GPB and manual cough unless done properly."
5. "Dries out mouth."
6. "Makes throat sore trying to learn."
7. "Wears me out, tiring."
8. "Is extremely monotonous."
9. "Is not involuntary."

Discussion

The findings of the study are in accord with those attitudes that have been observed clinically in patients during the years the glossopharyngeal breathing technic has been in use in this hospital. The two main drawbacks suggested by the patients in this study are feelings that this method of breathing is cosmetically undesirable and it is difficult to learn.

One deterrent in patient motivation which has been clinically observed, though not revealed by this study, is that patients tend to get the impression as soon as the use of glossopharyngeal breathing is suggested that no further recovery of normal breathing ability is expected. Another drawback, which was not revealed in this study but was previously cited,[2] is the Valsalva action that may result from high intrathoracic pressure caused by forcible expansion of the chest. This may cause the patient to experience a fullness in the head, and possibly a feeling of dizziness and faintness. These symptoms may be avoided by proper instruction and supervision of the patient.

It has been our experience that the positive features of glossopharyngeal breathing outweigh the negative; whenever it is indicated it should be strongly encouraged. The indications and contraindications for glossopharyngeal breathing have been discussed elsewhere.[2] The current study indicates that when patients are properly informed they are highly motivated to learn this breathing technic.

Since this preliminary study consisted of only 50 patients, it was felt that any attempt to test for statistical significance was not indicated; however, none of the findings reported appear to contradict the clinical impressions of the staff.[2] Further refinements of the attitude scale are contemplated, with the findings to be reported at a later date.

Further differential study needs to be done on the relationship between the attitudes of those patients who find that learning the glossopharyngeal breathing is difficult with those who seemingly do not. While the learner's attitude toward the technic may affect the ease or difficulty of learning, other factors need to be considered. The attitudes of the patient to the teacher, the relationship of the ease or difficulty encountered in learning glossopharyngeal breathing, and the length of time since the onset of the disease are all problems requiring further study.

Summary

In this study the attitude of the patients toward glossopharyngeal breathing is evaluated. In making this evaluation, 157 statements were collected from patients, with reference to the desirable and undesirable aspects of this breathing technic. Fifty-three of these statements were submitted to a group of 59 members of the professional staff of this hospital with the request that they rate the negative-positive nature of each statement on a seven-point equal-appearing interval scale. The scale value of each statement was obtained by computing the median scale position as assigned by the judges. These statements in turn were presented to the patients in order to evaluate their attitude toward the glossopharyngeal breathing technic.

The findings indicated that the attitude of the patients did not differ greatly regardless of whether or not they depended on glossopharyngeal breathing. Positive attitudes were expressed concerning the role of glossopharyngeal breathing in functional rehabilitation, as an aid to bodily function, security, and safety, and as a treatment technic. The majority of the negative attitudes concerned cosmetic effect, difficulties encountered, and effort required in the learning process.

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Disability Evaluation

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The subject of disability has reached a greater point of interest as society has broadened its conscience toward human welfare. Modern inventions and industrial activity have greatly increased the frequency of accidental injuries, but the trend of decreased accident severity throughout the industrial world has been far more than offset by the automobile.

The definition of accident as taken from the English Compensation Law is "personal injury by accident arising out of and in the course of employment."[1] Inability to engage in gainful work because of illness or injury ranks high among the economic hazards of workers and their families in the United States. In a sickness or disability claim, the definition and the facts of the case are frequently blended. Against the background of what he regards as disabling sickness or disability, a physician has to decide whether a patient is or is not disabled and incapable of engaging in gainful work, or a qualified adjudicating committee has to make this decision on the basis of the physician's report as well as other pertinent information. The doctor, attorney, jury and industrial commission must have a clear understanding of their mutual medical problems.[2]

Wisconsin was the first state to introduce and pass a bill, in 1911, to deal with the injured worker; now 44 states and 3 territories have compensation laws. Germany was the first to introduce and pass workmen's compensation nationally in Europe in 1883.

In the United States at least 4,000,000 and according to some estimates 5,000,000 individuals are permanently physically handicapped, of whom approximately 70 per cent are males. Of the total, between 2,000,000 and 3,000,000 are within employable age range. In addition, according to the Bureau of Vocational Rehabilitation of the United States Department of Education, some 800,000 persons become permanently disabled every year through congenital defects, accidental injuries or diseases.[3]

There has been much confusion in determining a satisfactory basis for compensation benefits for permanent disability. This is shown in the lack of uniformity in the schedules here and abroad. The terms "partial" and "total," "temporary" and "permanent" have in themselves caused considerable confusion by the varied interpretations put on them.[4] An injured carpenter may receive $200.00 for the loss of a thumb in one state and $100.00 in another. One usually cannot predict within 50 per cent of error how much will be allowed for a stiff elbow. The majority of compensation acts list a few obvious disabilities and specify what the indemnity for each is to be.

Based on the description of disability and estimates of comparative values given by physicians, the industrial board fixes the specific indemnity to be paid. Considering that there is no commonly accepted standard of comparative values between different disabilities, it is not strange that awards for similar conditions vary enormously, not only in different states, but in the same state.

The Wisconsin Industrial Commission reveals in a survey for the years 1939 to 1947 that permanent partial disability cases averaged between 8 and 9 per cent of all compensable injury cases settled under the law. Permanent partial disability cases have recently increased as a percentage of all cases settled, with an upward trend in 1953 to 11.7 per cent. Sprains and fractures lead the recent rise in permanent partial disability cases settled under the Workmen's Compensation

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Law. In 1938 sprains comprised 2.6 per cent and fractures 25.3 per cent of such cases; in 1953 these percentages increased to 8.9 and 31.7 per cent respectively. The indemnity and medical costs in back injury cases from sprains or strains averaged $3,900.00 per case.[5]

In a reviewal by Landoff of 154 fracture cases of the thoracic and lumbar spine 72 of the patients were and 82 were not insured.[6] The two groups were similar and statistically comparable. The most pronounced posttraumatic deformities were seen more frequently in the elderly patients. Younger patients returned to work earlier than older patients, in whom permanent disability was more common. The type of occupation had no appreciable effect on duration and frequency of symptoms or permanent disability. Patients with deforming spondylosis required longer convalescence, and frequency of partial or permanent disability was higher. Deforming spondylosis is to a large extent an aging phenomenon and independent of the type of the fracture or degree of posttraumatic deformity. Fractures with disc injury have poorer prognosis and were not evaluated in this group. In none of the cases was working capacity permanently reduced. Deformity was not accompanied by increased symptoms or decreased working capacity. Spondylosthrosis did not play a dominant role in the causation of symptoms.

Among other things, the patient's reports of local back pain as compared with the clinical observations such as a sign of reaction to pain provoked at the reviewal (provoked local pain) differed in a way that suggests that insured patients exaggerate their symptoms. This was particularly true in patients with fracture of moderate severity; those with slight injury and those with the severest injury did not show any tendency to such exaggerations. Symptoms of back pain and weakness were common in the insured, disability was more frequent, and symptoms and convalescence were longer.

For purposes of cash indemnity under social insurance, disability means inability to work at gainful employment. The physically handicapped are those who suffer from organic disabilities that are protracted and that interfere with normal living. Disability of any organ might produce a physical handicap, but those most frequently responsible are the bony, muscular, sensory, circulatory, and respiratory systems. How disabling a condition must be and how long it must persist before it becomes a physical handicap is a matter of arbitrary definition. The condition requires a limitation on the varieties of work that the employee might safely perform and the persistence of the condition for a minimum of one year.

Three methods are in common use whereby the basis for compensation benefits is fixed. In one, payment is made on the basis of loss of earnings during the period of disability, the amount being subject to maximum limits. The second method is payment on the basis of fixed periods for specific injuries, the injured receiving a certain percentage of wages earned at the time of his injury. The third method is a combination of the two previous ones.

In choosing a definite criterion for the evaluation of permanent disability, several considerations must be satisfied. The method must be accurate and must not be affected by the variations of the disabilities. In public accidents the courts and juries of laymen have taken upon themselves the task of appraising the physical disability, and such factors essentially variable as loss of wages, alleged pain and suffering, and other emotional and sentimental considerations take the place of a just and scientific computation of the individual loss as a social, industrial, and economic unit. The physician should know that disability evaluation should be based on scientific facts alone, facts entirely independent of economic difficulties and functional maladjustments. In the final adjustment, it is the duty of the referee to decide whether Joe Doe is going to return to his regular work or whether he is going to return to work at all. It is admittedly true that the compensation law was devised to benefit the workman, to award

compensation for loss of time or for interference with bodily function. It is also admittedly true that he should be favored in the case of any doubt, but it is likewise just that industry should not be exploited.[7]

The psychologic attitude of the patient as a claimant is often incompatible with his attitude as a personal patient. The physician must recognize the necessity for sound judgment, tact, and artful investigation in formulating a diagnosis and opinion.[8] When the patient is a claimant, many factors arise that alter the trustworthiness of the related history and subjective complaints. Thoroughness becomes paramount. Caution and clear thinking are essential. Confusion must be avoided by careful evaluation of the established patterns of disease or injury from the irregular allegations motivated by the desire of reward. Symptoms and complaints should be substantiated by clinical findings.

In many states the computation of permanent disability ratings depends upon complete and adequate medical reports. Reports and disability ratings often vary among physicians. This is because many find themselves deficient in being able to determine, appraise, and evaluate the difference between the person as he was before his injury and the variation from normal after recovery. The courts and society demand an answer for extent of disability in terms of percentage of loss of use of the body. The wide differences in the medical reports immediately cast reflections on the integrity and qualifications of the medical examiner. A uniform manner of making reports is essential; therefore, the medical examiner's report should paint a written picture that can be re-created by laymen as well as by other medical men. Any opinion expressed must be based upon scientific reasoning based upon the diagnosis. The report of the medical examiner should cover all disabilities arising from the injury, including subjective complaints. Permanent disability rating reports should not be submitted to a commission until the attending surgeon concludes that the condition will neither improve nor retrogress in the future. It is difficult to arrive at a uniform percentage conclusion because the attitudes of physicians toward making evaluations of disability in terms of percentage differ greatly. There is no uniformity of opinion among physicians in regard to disability evaluation, only because there is no acceptable scheme for disability evaluation; however, if experienced men are able to agree fairly closely on the percentage of disability in an injured member, it must be possible to devise a method by which the calculation of disability can be more or less accurately determined. It must also be possible to teach such a method to others who have not been able to accumulate an abundant experience in this field of surgery. The physician who makes only an occasional estimation of disability has neither the time nor the inclination to spend hours learning a complicated method by which disabilities can be calculated. The estimation, calculation, or evaluation of disabilities has been on the whole a very inexact science in the practice of medicine and many are based on a method of a look and a guess.[8]

The individual physician is not entirely to blame for his lack of ability in this regard. He has not been taught how to calculate a disability. Disability is a term that implies a transformation of body structures that results in a depreciation of normal ability to perform the functions of established physical accomplishments.

Severe physical deformity is often overshadowed by energetic studies toward compensating development. On the contrary, discouragement and lack of opportunity or self-reliance may bring defeat to one whose physical handicap is comparatively unimportant.

With the introduction of the compensation law, a new specialty in medicine evolved, the specialty of compensation practice and disability evaluation. Medical schools have not recognized the need for specialized teaching in this field, and their schedules do not include the subject. As a result, the average physician is ignorant of the confines of the com-

pensation law and at a total loss when it comes to disability evaluation.[7] Vague reports of doctors are usually indicative of a lack of knowledge upon the writer's part, of laxity in describing the injury, or they are deliberate. Regardless of the reason, these reports are among the most potent danger signals of medicine. They call for the removal of the uncertainty, either through explanation by the attending doctor or through special examination.

In order to be an expert in examining and analyzing the disability of a person, much more should be known than that revealed grossly by the ordinary physical examination. The first step in the medical study of a case should be through the attending physician. He is the source of all original information. He knows more about the case than any special examiner can possibly learn as the result of study during a single hour. The special examiner listens to the story of the complaints. These are almost invariably distorted, subconsciously or wilfully. Great faith is placed in the expert's conclusions and rightly, but one must recognize the limitations under which he must work. The special medical examiner should always discuss the case with the attending physician. The code of medical ethics provides that physicians should discuss patients together before reaching conclusions. This provision is not for the protection of the medical profession, but for the protection of the patient.

The first problem for a physician treating a patient involved in an industrial accident is to determine the period of temporary disability. To determine when a man is able to return to work is sometimes difficult, because too frequently the determining factor is not the clinical condition but the man's own desire to return to work. In many cases confidence and morale are lowered and shaken, thus impairing his earning power. In other cases frank malingering exists and must be dealt with accordingly. The necessity for some guide in determining the average period of incapacity for given clinical conditions is apparent.

After a man has returned to work, the next problem is to determine the extent of permanent damage or loss of function that may remain. The responsibility of translating this disability into mathematical percentages has been left to the physician. The law does not assist him in reaching a decision because it stipulates only the amount of compensation to be paid for complete loss of the part. The general practice has been to make the best of what seems to be a hopeless task by relying upon a guess and dignifying it with the title of opinion or estimate.

Most authors on the subject recommend that disability evaluation be based primarily on a functional and anatomical basis. One should have an accurate anatomical evaluation both of the anatomy of the part involved and also of its physiological functions. This presupposes a good working knowledge of the range of motion of all of the joints of the body, and it likewise presupposes a clear understanding of the function of most of the muscles of the body. The range of motion of a joint should be expressed with mathematical precision using a protractor for the measurement. By using the protractor, the degree of motion of the joint can be expressed accurately. Then the result should be the same regardless of how many people examine that particular joint. For further clarification, nomenclature should be standardized. For example, for the fingers some say thumb, index, middle, ring and small finger; and others, thumb, first, second, third and fourth finger.

Everyone treating and reporting industrial accidents should acquaint himself with certain general instructions. The starting position for the measurement of joints is the anatomical position of such joints. Measurement always represents the arc of voluntary motion of the joint and is shown by degrees, the arc of motion in the injured always being placed over the arc of motion in the uninjured as a fraction. For example, with the patient in an anatomical position, he is instructed to bring both upper extremities from the starting point laterally, until the arms are near the ears, forearms remaining supinated. The apex

of the protractor is placed at front of shoulder joint with one arm of the protractor parallel to the midline or axis of the body and the other along the axis of the arm. The arc of voluntary motion of both arms is measured and reported as a fraction, with the injured over the uninjured side. In this case 130°/180° or 130° of retained motion (or 50° of lost motion 50°/180°) represents 27.7 per cent disability in this arc of motion. No error can be made in the interpretation of the protractor reading when finding the arc of voluntary motion, provided the examiner will observe the pointer reading at the starting position and record the excursion in degrees of the pointer. Since it is impractical to measure some joints with a protractor, the examiner must estimate the existing voluntary arc of motion in the injured joint as compared to that in the estimated normal.

In examining the spine, the level of gluteal folds, postural deformity, scoliosis, kyphosis and lordosis are noted. In forward bending the distance that finger tips miss the floor is measured. In backward bending, right and left lateral bending, and right and left rotation, the arc of voluntary motion must be estimated and percentage of normal reported.

All joints of an injured extremity should be examined and complete girths must be reported using a flexible steel tape. In injuries involving the spine, the extremities should be completely examined.

Subjective complaints are important to reveal frequency and location of pain and factors that aggravate or relieve it. The examiner must evaluate the patient's threshold of pain and determine whether it is consistent with the injury.[9] The examiner must also evaluate tenderness, sensory disturbances, weakness, and fatigue with regard to character, degree, and location. Abnormalities and deformities should be described thoroughly and it should be noted whether or not the injury is the cause.

The literature does not provide a great deal of information on the normal range of motion in the joints of the upper and lower extremities. The contralateral normal joint is the logical standard against which to calculate the disability in the opposite injured member.

The percentage of disability to an industrial member for a specific functional or anatomical loss should be constant under all circumstances. A disability may vary in accordance with functional and anatomical variations. It should not be influenced by age, sex, or occupation of the injured. The loss or lost use of a finger, or any other industrial member, should constitute 100 per cent loss of that member whether in young or old, male or female, ditch digger or violin player. To be sure, its value to the violinist may cost him his profession and would in that sense be worth more from a remunerative standpoint, but the problem of determining that is no more the physician's than it is any other disinterested individual's.

The percentage of disability in a member should be constant no matter in what state it exists or within what boundaries it occurs; the award for such a disability may vary, depending upon those factors, but that too is a problem for the industrial commission to establish and not a problem for the physician. On the other hand, the physician, who understands the anatomy and function of the human body, should take the responsibility of accurately determining the physical disability of an industrial member. The industrial commission should take the responsibility of establishing, or varying, the remunerative award in accordance with the injured individual's employment.

Only the useful range of motion is measured. Using as much as possible only objective evidences of disability leaves the calculation of disability uninfluenced by sentiment, sympathy, or personal interpretation.

Summary

The inadequacies and short-comings of factors that influence disability evaluation have been reviewed. Fractures lead to more disability than any other type of

injury among major claims. In the examination of a patient involved in an industrial accident the physician should bear in mind that three essential parts should be covered in his report: the history; the findings; and the medical conclusion. The physician should know that disability evaluation should be based on scientific facts alone, facts entirely independent of economic difficulties and functional maladjustments. The indemnity award based on the medical report and other variables should be the responsibility of the industrial commission. Medical calculations for evaluation should be uniform everywhere and to be so must be on a mathematical basis. Specialized knowledge, training, and experience are necessary to the proper handling and administration of our compensation laws, and this extends also into the professional fields. Experience and judgment are difficult bits of medical knowledge to dispense; they must be learned through years of practice. The physiatrist usually determines the time of maximum improvement in rehabilitation and therefore is in a unique position to evaluate disability. More information on this subject should come from this source.

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Tissue Temperatures Produced by the Application of Moist Air

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Although heated moist air has been used for many years as a source of therapeutic heat,[1] the thermal effects produced have not been investigated in detail. Earlier reports seemed to indicate that temperatures in the deep-lying muscles of animals could be elevated to "between 106 and 107 degrees F."[2] The purpose of the present study was to determine the rise in body temperature and tissue temperatures at various depths in humans during treatment in the moist air cabinet.

Equipment

The study was conducted in a room in which the initial temperature was kept within the range of 24.5 to 25.8 C. to minimize any influence that variations in ambient temperature might have on the tissue temperatures. In studies of the effect of humidity, it has been found that for each 1 per cent increase in relative humidity above 36 per cent, the skin temperature is raised only 0.01 C.;[3] therefore, any change in humidity in the room should alter the skin temperature only minimally.

Body temperature was registered continuously by a rectal thermocouple. An iron-constantan surface thermocouple (Leeds-Northrup) was used to measure skin temperature. The subcutaneous and muscle temperatures were determined by copper-constantan thermocouples constructed of 38-gage insulated solid-strand wire housed in 22-gage hypodermic needles. The thermocouple junctions were soldered at the needle tips, and the thermocouples were connected by nylon-covered multiple-strand wire to a Brown Recording Potentiometer, which recorded the temperatures on a continuous chart.

A commercially available heated moist air cabinet was used for the application of heat. In this instrument the air is humidified and heated by passage through a warm water spray, and is then circulated within a steel hood. Temperature in the cabinet is regulated by a thermostat that controls the water temperature.

The accuracy of the equipment and the suitability of the proposed technic were determined by means of preliminary experiments. The needle thermocouples were compared with a National Bureau of Standards mercury thermometer and found to be accurate within 0.2 C. Since the thermocouples were to remain inside the cabinet for continuous recording during the heating period, the insulation of the needles was checked for adequacy. Tests showed that exposure of the insulated handles to moist air did not affect the thermocouple junction readings. The surface thermocouple was found to be accurate within 0.05 C. Previous investigators have found that the precision of measurement with bare-wire surface thermocouples depends on the pressure of the thermocouple against the skin;[4] therefore, an attempt was made to apply equal pressure in all experiments, to avoid gross errors in skin temperature measurements.

The cabinet thermostat was set at the same position in all of the experiments. At this setting the water temperature was 50 C.; the air temperature inside the cabinet rose to 44.4 C. within 10 minutes

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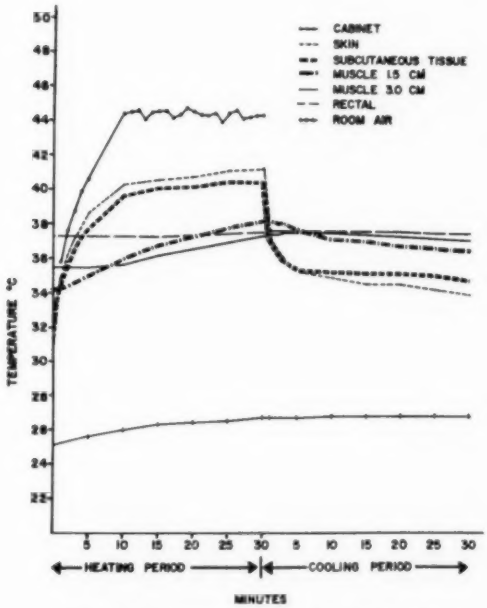

Fig. 1 — Average temperatures in the thighs of human subjects during and after the heating of both legs in the moist air cabinet for 30 minutes.

and was maintained at this level, with variations of ±0.4 C., through the remainder of the heating period.

Procedure

The healthy young adult males who served as subjects remained at rest for 30 minutes or longer in the room where the experiments were to be conducted. Each subject wore swimming trunks and had a towel covering the chest. During the rest period the surface thermocouple and three needle thermocouples were applied to an area on the anterior surface of the thigh, one-third of the distance from the patella to the anterior superior iliac spine. One needle was inserted into the subcutaneous layer and two into the muscle, one at a depth of 1.5 cm. and the other at a depth of 3 cm. The rectal thermocouple was also inserted during this period. All of these thermocouples remained in place throughout the heating and cooling periods of each experiment.

When the body and tissue temperatures had become stabilized, the cabinet was placed over the area of the body to be heated, and the 30-minute heating period was begun. The subcutaneous and muscle temperatures were recorded continuously. Room temperature and the rectal and surface temperatures of the subject were read at 1-minute intervals. The pulse rate was taken at 5-minute intervals. At the end of the 30-minute period, the cabinet was quickly removed and the skin dried to remove the condensed water. Temperatures were recorded for an additional 30 minutes during cooling.

Different areas of the body were heated in three series of experiments. In the first series, heat was applied to both legs below the iliac crests. In the second series, the right leg was heated, the unheated left leg being used as a control. In the third series, the entire body below the neck was enclosed in the moist air cabinet.

Results

Figure 1 illustrates the temperature changes produced by application of

Table 1: Average Temperatures at Ten-Minute Intervals Produced by the Application of Heated Moist Air

Site of Measurement	Area of Application	No. of Subjects	Initial Temp., °C.	Temperature, °C. Heating 10 Min.	20 Min.	30 Min.
Skin	One leg	6	32.8	40.9	40.9	41.2
	Two legs	10	30.9	40.3	40.8	41.3
	Entire body	2	32.6	40.8	42.0	42.3
Subcutaneous tissue	Two legs	10	32.4	39.6	40.2	40.5
	Entire body	2	33.6	41.3	42.2	42.3
Muscle — 1.5 cm.	One leg	8	34.9	36.1	37.2	37.7
	Two legs	10	34.2	36.0	37.3	38.2
	Entire body	2	35.1	36.8	38.2	39.1
Muscle — 3.0 cm.	One leg	7	35.8	35.9	36.5	36.9
	Two legs	10	35.5	35.7	36.6	37.4
	Entire body	2	35.8	36.2	37.3	38.2
Rectal	One leg	8	37.0	37.1	37.3	37.4
	Two legs	10	37.3	37.3	37.4	37.6
	Entire body	2	37.4	37.5	37.9	38.6

heated moist air to both legs. Each line represents an average of the results obtained in ten experiments on six subjects. The superficial tissues heated and cooled more rapidly than the deep tissues. The skin temperature rose 9.4 C. in the first 10 minutes and only one additional degree in the remaining 20 minutes, reaching a maximum of 41.3 C. On cessation of heating, the temperature dropped 5.9 C. in the first five minutes and then decreased more gradually. The curve representing the increase and decrease of the subcutaneous tissue temperature was similar to that of the surface temperature. The highest subcutaneous temperature was 40.5 C.; this occurred after 30 minutes of heating. In muscle tissue at a depth of 1.5 cm., the temperature rose to 38.2 C. during 30 minutes of heating and decreased gradually when the heating was discontinued. At a depth of 3 cm., the temperature continued to rise for 3 minutes after the heating period ended, reaching a maximum of 37.6 C. After this, cooling occurred slowly.

Moist air was applied to one leg in eight experiments and to the entire body in two experiments. The curves representing the temperature readings in both of these groups were similar to those in figure 1; however, there were slight temperature differences. The table shows the temperature readings at 10-minute intervals. Figure 2 graphically illustrates the differences in the average temperatures produced. The skin temperature rose to 41.2 C. when one leg was heated, to 41.3 C. when both legs were heated, and to 42.6 C. when the entire body was heated. The maximum subcutaneous tissue temperature was 40.5 C. when heat was applied to both legs, and 42.3 C. when applied to the total body. The subcutaneous tissue temperature was not recorded when one leg was heated, since the third needle thermocouple was used to measure temperature in the control leg. The muscle temperature at a depth of 1.5 cm. rose to 37.7, 38.2 and 39.1 C., respectively, with the application of heat to one leg, both legs, and the entire body. The temperature at a depth of 3 cm. was elevated to 37.2, 37.6, and 38.4 C. Rectal temperature rose 0.4 C. when one or both legs were heated, and 1.4 C. when the entire body was heated. The maximum rectal temperatures were 37.4, 37.7 and 38.8 C., or 99.4, 99.9 and 101.9 F.

Two additional experiments were performed with the cabinet enclosing the entire body in order to observe the effects of a lower cabinet temperature (41.8 to 42.6 C.). The temperatures produced were somewhat lower and the subjects were more comfortable during the treatment. The average maximum temperatures were 39.5, 38.9, 37.5, and 37.4 C. at the skin, subcutaneous, 1.5 cm., and 3 cm. levels respectively. Rectal temper-

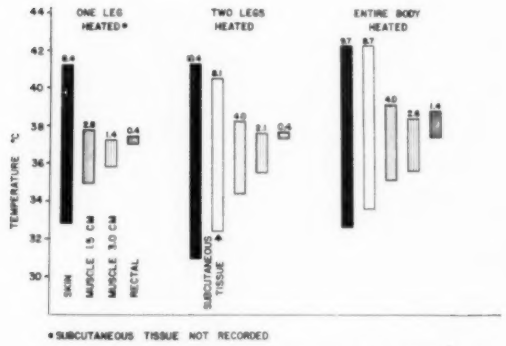

Fig. 2 — Average temperature changes in the thighs of human subjects after a 30-minute application of heated moist air to different areas of the body. Number above each column indicates temperature rise. Base of column represents initial temperature and top of column represents maximum temperature.

ature was elevated to 38.1 C. (100.5 F.).

When heat was applied to one leg and the unheated leg was used as a control there was no temperature elevation of the tissue at a depth of 3 cm. in the control leg.

Discussion

Figure 1 illustrates the amount and rate of increase in tissue temperatures at various levels. Before heating, the gradient of the tissue temperature was from warmer deep muscle to cooler skin. When part or most of the body was placed in an environment of heated or humidified air, the superficial tissues heated rapidly and the deeper tissues heated more slowly, so that the temperature gradient soon became reversed. During cooling, the gradient returned to the original direction, although initial temperatures were not regained within the observed 30-minute cooling period. The body temperature elevation was greater when the area of exposure to heat was increased and the area from which heat could be lost was decreased.

The application of heated moist air is effective, safe, and reasonably comfortable for the patient and can be used in conditions requiring either general or local heating. In prescribing this treatment consideration should be given to the area of the body to be treated, the cabinet temperature, and the length of the heating period. When most of the body is enclosed in the cabinet, tissue temperatures are slightly higher and rectal temperature is considerably higher than when smaller areas are heated. In our study the two subjects who were treated by the total body exposure method, with the cabinet set at the maximum temperature, noted extreme discomfort after 20 minutes of heating. They became restless and complained of light-headedness and numbness or tingling of the fingers. The pulse rates increased to as high as 128. At a lower cabinet temperature, the subjects were comfortable during the first 25 minutes of heating, and increase in pulse rate was only moderate. There were no untoward reactions when the maximum cabinet temperature was used in heating one or both legs.

The experimental results may also serve as a guide in prescribing local heating. In our study, tissue temperatures were elevated 1.4 to 2.1 C. at a depth of 3 cm. when one or both legs were heated with the cabinet set at the maximum temperature (44.4 C.).

Summary

Body and tissue temperatures were measured in normal male subjects during and after 30 minutes of heating in a moist air cabinet. The results indicated that the application of heated moist air

at a temperature of 44.4 C. produced a rise in the temperature of tissues at a depth of at least 3 cm. Higher body and tissue temperatures were produced when heat was applied to the entire body than when one or two extremities were heated. The treatment is considered safe and effective for both local and general heating when due regard is given to the optimum area and time of exposure and temperature of the cabinet.

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Acknowledgment: The authors are grateful to the Ries Corporation for providing a "Moistaire" cabinet for this study; to the staff of the Veterans Administration Hospital in Ann Arbor for making the facilities of that hospital available to us, and to D. V. Theofil, M.Sc.E.E., for constructing the needle thermocouples.

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MEMBERS ATTENTION:

Members of the Congress who have ideas regarding reorganization of the regional sections of the American Congress of Physical Medicine and Rehabilitation, in order to enhance their value to the membership, are urged to write to G. K. Stillwell, M.D., 200 First St., S. W., Rochester, Minn.

Cost of a Comprehensive Community Program for Cerebral Palsy

Paul A. Nelson, M.D.
and
Robert D. Mercer, M.D.
Cleveland

This report is a sequel to one presented in May, 1955,[1] which described a community-wide program for the care of children and adults with cerebral palsy in the Greater Cleveland area. This area includes Cleveland, 19 other contiguous cities, 38 villages, and 4 townships, which comprise a community of 1,501,600 population (October, 1954). This study was undertaken at the suggestion of the discussant[2] of the previous report who felt that data concerning cost of care for persons with cerebral palsy would be of considerable value to communities planning similar programs.

Our previous report stressed the importance of comprehensive planning for cerebral palsy by health and welfare agencies within the community. Through such agencies in Cleveland, the various organizations interested in cerebral palsy have obtained an accurate picture of the community's resources and needs for diagnosis and treatment, for education, for vocational guidance, for custodial care, and for financial assistance to persons handicapped by cerebral palsy. The Cleveland Health Council in 1952 conducted a survey of 24 agencies providing services to such persons and found a total of 543 children with cerebral palsy, an incidence of 1.4 known cases per 1,000 population less than 20 years of age. The Welfare Federation of Cleveland in 1951 compiled detailed information concerning children less than six years old with mental and/or physical handicaps who were in need of some services not provided by facilities within the community. With the information from these surveys, Cleveland has been able to plan to meet the needs of persons with cerebral palsy without duplication of expensive services. Co-operation rather than competition has been fostered among the agencies that provide services to these people. In this manner Cleveland is striving to achieve a comprehensive program for cerebral palsy.

Cost of Services

United Cerebral Palsy Association of Cuyahoga County: Founded only five years ago by a group of parents of children with cerebral palsy, the Cuyahoga County Chapter of The United Cerebral Palsy Association (U.C.P.A.) now plays an important role for children and adults with cerebral palsy in this area. Table 1 summarizes the cost of the various services of this organization for the period from July 1, 1954, to July 1, 1955.

Table 1: Cost of Services Provided Through United Cerebral Palsy Association of Cuyahoga County.

Service	No. of Persons	No. of Persons Financed by U.C.P.A.	Units of Service	Cost
Medical program of diagnosis and therapy	132	91	3,561	$ 10,393.04
Speech therapy	66	66	1,179	2,787.49
Adult program	27	27	570	3,746.33
Braces and appliances	5	5	—	577.59
Academic readiness classes	24	24	2,969	9,052.67
Summer camping for adults	29	17	326	1,895.75
Transportation	22	22	3,337	6,085.35
Parent education	47	47	224	1,469.85
Social service	269	269	757	492.18
Allocation to National U.C.P.A. for research and training				33,193.65
Office and Administration				13,623.05
Public relations				3,212.70
Fund raising				10,659.06
TOTAL				$ 97,188.71
Special Grant from National U.C.P.A. for summer workshop on speech therapy				5,400.00
GRAND TOTAL				$102,588.71

Read at the Thirty-third Annual Session of the American Congress of Physical Medicine and Rehabilitation, Detroit, September 2, 1955.

Head, Department of Physical Medicine and Rehabilitation (Dr. Nelson); Head, Department of Pediatrics (Dr. Mercer), The Cleveland Clinic Foundation and The Frank E. Bunts Educational Institute.

It has been the policy of this organization to use facilities already present within the community rather than to set up separate facilities. Thus, U.C.P.A. sponsors a medical pr ·am of diagnosis and therapy in co-oper ion with the Cleveland Clinic and a program of speech therapy with the Cleveland Hearing and Speech Center. These programs will be described later in this paper.

During the year of this survey, 27 adults participated in the adult program sponsored by U.C.P.A. at the Cleveland Rehabilitation Center, which provides evaluation of potential for rehabilitation, group instruction in English and speech, and social and recreational activities including supervised swimming. This group of adults meets weekly throughout the year. During the summer, U.C.P.A. organized and financed a two-week program of camping for 29 adults at Camp Cheerful, which was loaned for this purpose by the Society for Crippled Children of Cleveland.

Twenty-four children between the ages of 6 and 11 years were enrolled in academic readiness classes conducted by U.C.P.A. in one of Cleveland's public schools. These children attended either the morning or afternoon session five days a week; the more severely handicapped children attended the morning session. The purpose of this program is to give special training to children disqualified from public school either because of behavior problems or because their intelligence measures below the minimal standard (I. Q. 70). Through such training U.C.P.A. seeks to help these children adjust to the point where they will be accepted in some phase of the regular public school program: for example, Sunbeam School for Crippled Children or the slow-learner classes in other schools. Transportation to and from these classes is provided by U.C.P.A.; a major expenditure during the past year was the purchase of a station wagon.

Another activity of this group is the parent education program, which was attended by 47 parents during the past year. The cost of social service for the children and adults with cerebral palsy known to this agency has been minimal, since the social service worker has donated her full-time services, charging only her expenses to this organization.

A large item in the budget of U.C.P.A. is the amount allocated to the national organization with which it is affiliated; this money is used for research in cerebral palsy, training of personnel, and public education. An example of the use to which such funds are put is the special grant from National U.C.P.A. in 1954 to the Cleveland Hearing and Speech Center for a six-week summer workshop on speech therapy for children with cerebral palsy.

Society for Crippled Children of Cleveland: Since it began operation in 1940, the Society for Crippled Children, the Easter Seal agency in Cleveland, estimates that it has helped more than 4,500 children. Although it is not exclusively interested in cerebral palsy, the amount of money it spends in the care of children with cerebral palsy is greater than that spent by any other private or public agency. The services it provided this group of children from July 1, 1954 to July 1, 1955 are listed in table 2.

The Society operates a modern, beautifully equipped West Side Center where an experienced staff provides physical therapy, occupational therapy, speech therapy, and a nursery school program to children on an outpatient basis. A similar program is carried out on the East Side in cooperation with the Cleveland Rehabilitation Center. Lunch and transportation are provided at both centers. For children who are too severely crippled to leave home, visiting therapists and volunteer aides provide a homebound program of occupational and recreational therapy; a weekly radio school program also reaches these children.

Camp Cheerful, which is owned by the Society, is a year-round camp for crippled children; last year 64 children and adults with cerebral palsy took part in the regular two-week summer camping sessions. Other events, such as weekend outings and parties, in which 177 children with cerebral palsy participated, were held throughout the year.

Table 2: Services to Children with Cerebral Palsy Provided by Society for Crippled Children of Cleveland.

Service	Number of Children	Units of Service
East Side and West Side Centers		
Physical therapy	105	3,336
Occupational therapy	59	1,697
Speech therapy	46	1,288
Nursery school	77	3,166
Meals served	80	3,266
Transportation	106	4,634
Homebound program		
Occupational therapy	8	184
Recreational therapy	11	261
Weekly radio school	13	—
Camp Cheerful		
Summer camping sessions	64	896
Week-end outings and other events	177	—
Equipment and Appliances		
Loans of wheelchairs, other equipment	54	—
Provision of braces and appliances	82	—
Medical services and emergency care	184	—
Psychological services testing	34	—
Vocational counseling and guidance	18	—
Medical social service	342	—

Table 3: Cost of Services to Children with Cerebral Palsy Provided by Society for Crippled Children of Cleveland.

Service	Cost
East Side and West Side Centers	
Salaries (professional, service, and administrative)	$ 53,258.19
Meals for patients	1,245.56
Transportation of patients	4,404.40
Maintenance (utilities, rent, janitor, and insurance)	2,539.83
Supplies (school and treatment)	1,442.00
Office expenses	2,185.98
Development of West Side Center	1,721.46
Camp Cheerful	
Year-round operations	6,519.10
Equipment	2,342.64
Improvement and development	17,749.58
Equipment loans, braces and appliances	5,700.00
Medical services and emergency care	2,688.02
Psychological services	1,216.00
Allocation to national and Ohio societies for crippled children	9,501.48
Public relations	857.31
Fund raising	5,126.10
Project equipment	541.81
TOTAL	$119,039.46

The Society follows a most generous policy in provision of equipment to children with cerebral palsy: 54 children were loaned wheelchairs or other equipment, and 82 received special braces or assistive appliances prescribed by their physicians. When the need exists, the Society pays for medical services and emergency hospital care; during the year, 184 children with cerebral palsy received such services.

When children under 18 years of age require psychological testing or vocational counseling and guidance, the Society makes necessary arrangements with community agencies or qualified individuals and pays whatever fees are charged. Thirty-four children with cerebral palsy received psychological testing in the past year and 18 received vocational guidance.

Table 3 lists the cost of various services provided by the Society for Crippled Children of Cleveland. The figures included in this table were obtained through the co-operation of the staff members who reviewed their respective case-loads and estimated the proportion of their working time that was spent with children who had cerebral palsy; from these estimates, expenses that could be charged to cerebral palsy were calculated.

The amounts charged to cerebral palsy for new equipment and for improvement and development of facilities represent about 25 per cent of total agency disbursements for these purposes. Since 9.1 per cent of all income to the Society was allocated to affiliated national and state organizations, this per cent was applied to the total costs for services to children with cerebral palsy in order to obtain the figure listed on table 3. The cost of fund raising amounts to 4.5 per cent of all agency income; similarly, this per cent was used to calculate the amount charged to cerebral palsy. *Diagnostic and Treatment Center for Cerebral Palsy (Cleveland Clinic):* One hundred forty-five children and adults with cerebral palsy were seen in the Diagnostic and Treatment Center for Cerebral Palsy of the Cleveland Clinic between July 1, 1954, and July 1, 1955. Of this group, 72 patients received their initial diagnostic studies during this year, 2 children were admitted for psychometric testing only, and the remaining

71 children and adults had been admitted to the program before July 1, 1954, but had returned for therapy or additional diagnostic services. Eighty-five per cent of the entire group were referred through U.C.P.A., ten per cent through the Society for Crippled Children of Cleveland, and the remainder were admitted as private patients independent of either agency.

Table 4 lists the services provided at the Cleveland Clinic for persons with cerebral palsy, and the total charges made in caring for this group of 145 children and adults. Because a fairly large number of "no charge" rechecks are made, and because the Cleveland Clinic gives special rates to welfare agencies, some of the charges may seem quite low. Caution should be used in making any generalizations concerning costs of diagnostic programs or therapy on the basis of this analysis.

At the Diagnostic and Treatment Center for Cerebral Palsy an initial evaluation of a person with cerebral palsy includes a thorough history and careful physical examination by the pediatrician or the internist, consultations with the physiatrist and orthopedic surgeon and, when indicated, with the ophthalmologist, otolaryngologist, neuropsychiatrist, neurosurgeon, general surgeon, dentist, or specialist in speech and hearing problems. It also includes psychometric testing; roentgenograms of the skull, chest, and pelvis, when necessary; laboratory tests (hemoglobin, leukocyte count, differential cell count, serology, blood sugar determination, and urinalysis); and, frequently, an electroencephalogram.

During the past year hospitalization was found necessary on 33 occasions. In six patients dental procedures were carried out under general anesthesia; in two patients, pneumoencephalograms were obtained; and in ten patients, various operations were performed ranging from tonsillectomy or circumcision to obturator neurectomy, Stoffel neurectomy with lengthening of the Achilles tendon, and lumbar subarachnoid-fallopian tube peritoneal shunt. In the others, hospitalization was necessary for medical treatment.

Table 4:
Analysis of Services and Charges for Diagnosis and Treatment of 145 Children and Adults with Cerebral Palsy.*

Service	Admissions before 7/1/54				Admissions after 7/1/54			
	U.C.P.A.		Other		U.C.P.A.		Other	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Pediatric (or medical)								
History and examination	—	—	—	—	57	$830.00	15	$325.00
Recheck	102	$520.00	7	$40.00	48	115.00	16	34.00
Consultations and rechecks								
Physiatric	27	87.00	4	18.00	50	284.00	15	103.00
Orthopedic	28	73.00	3	15.00	35	222.00	7	33.00
Ophthalmologic	10	53.00	—	—	22	189.00	5	50.00
Otolaryngologic	3	15.00	2	5.00	14	78.50	7	25.00
Neuropsychiatric	13	39.00	—	—	5	25.00	1	12.00
Neurosurgical	—	—	—	—	2	5.00	1	—
Surgical	—	—	—	—	—	—	2	10.00
Dental	4	3.00	—	—	4	8.00	2	—
Speech and hearing	1	10.00	2	20.00	9	82.50	3	20.00
Psychometric testing	46	286.00	4	32.00	58	478.00	13	119.00
Roentgenograms	24	220.00	—	—	104	1183.00	27	295.00
Laboratory tests	112	120.00	9	3.00	335	371.00	104	114.00
Electroencephalogram	5	110.00	1	25.00	14	300.00	7	145.00
Hospital procedures	31	2520.11	—	—	26	1520.15	15	2530.60
Physical therapy	790	2543.00	36	132.00	374	1277.50	207	725.00
Occupational therapy	833	2392.75	34	95.00	317	955.75	54	153.50
Staff conferences	43	430.00	3	30.00	12	120.00	2	20.00
TOTALS		$9421.86		$415.00		$7944.40		$4714.10

*Data from Diagnostic and Treatment Center for Cerebral Palsy, Cleveland Clinic.

Each child receives individual treatments, usually on a weekly basis, in physical and occupational therapy at the Cleveland Clinic. At intervals of three to six months, children receiving extended courses of therapy are scheduled for discussion at a staff conference, which is attended by the pediatrician, physiatrist, psychologist, medical social worker, physical therapist, and occupational therapist. At these meetings the child's progress is evaluated and his future program is outlined.

The total charges made for diagnostic services and therapy to 145 children and adults during the year from July 1, 1954, to July 1, 1955, were $22,495.36. Of this amount, $10,393.04 was paid by United Cerebral Palsy Association of Cuyahoga County, $5,082.32 by the Cleveland Hospital Service Association (Blue Cross Plan), $324.54 by the Crippled Children's Services of Cuyahoga County Child Welfare Department, $198.50 by the Society for Crippled Children of Cleveland, and the remainder was billed to the parents.

Cleveland Hearing and Speech Center: In co-operation with United Cerebral Palsy Association, the Cleveland Hearing and Speech Center treated 66 children and adults with cerebral palsy between July 1, 1954, and July 1, 1955, giving a total of 1,179 units of service. Thirty children received 466 individual sessions of speech therapy, and 18 young adults received speech therapy on a group basis; the cost for this program ($2,787.49) was paid by the Cuyahoga County Chapter of U.C.P.A. Twenty-six children were treated in a summer workshop in speech therapy for children with cerebral palsy, for which a grant of $5,400 was made by the National United Cerebral Palsy Association to the Cleveland Hearing and Speech Center. This project, which lasted six weeks, provided not only an intensive program of speech therapy for these children but also clinical and academic training for 15 speech therapists who were granted scholarships by the National U.C.P.A.

In addition to the programs of speech therapy carried out in co-operation with U.C.P.A., 31 children and adults with cerebral palsy received 189 private sessions of speech therapy at the Cleveland Hearing and Speech Center.

Cleveland Board of Education: The Sunbeam School for Crippled Children is a public school for handicapped children less than 18 years of age that provides full-day classes from kindergarten through ninth grade, physical therapy, speech therapy, vocational classes, and recreational opportunities. Lunch is served to all children, and transportation is furnished to those residing in Cleveland.

For admission to Sunbeam School a child must be referred by his physician, have a mental age of at least five years, and have an intelligence quotient of 70 or better. For the school year 1954-55 the total enrollment was 260 children, of whom 82 were diagnosed as having cerebral palsy.

For the past year the cost for each child enrolled at Sunbeam School amounted to $998.01, which was $742.53 more than it cost for a child enrolled in regular public school. Thus the total additional cost of education for the 82 children with cerebral palsy enrolled at Sunbeam School during the past year was $60,887.46. Of this amount, the state of Ohio paid $32,800, or $400 for each child. The remainder, $342.53 for each child, was paid by the city or village in which the child resided.

Crippled Children's Services of Cuyahoga County Welfare Department: The crippled children's program in Ohio was established by law in 1919 for the purpose of providing financial aid when necessary to assure medical care for handicapped children less than 21 years of age, so that they might become young adults with minimum disability and maximum capacity for livelihood. A broad interpretation is given to the term "medical care" so that it includes not only physician's fees, hospitalization, drugs, and surgery, but also physical therapy, occupational therapy, braces and appliances, special shoes, transportation necessary for medical care, and foster home care.

During the period from July 1, 1954, to July 1, 1955, 42 children with cerebral palsy residing in Cuyahoga County received financial assistance through the Crippled Children's Services.

Rose-Mary Home for Crippled Children: Rose-Mary Home for Crippled Children is an inpatient treatment center for the full-time care of handicapped children between 2 and 12 years of age who are not bedfast and are educable. Medical supervision, nursing care, physical therapy, occupational therapy, speech therapy, dental care, and educational and recreational opportunities are provided. The capacity of this center is 50 children. In regard to admission there are no limitations as to race, creed, or place of residence; a trial period of 3 to 6 months may be arranged on referral from a physician if it seems likely that the child might benefit from the program that Rose-Mary Home offers. During the calendar year 1954, thirteen children with cerebral palsy from Cuyahoga County received inpatient care at Rose-Mary Home for a total of 2,373 days.

Highland View Cuyahoga County Hospital: Highland View Hospital is a 450-bed county hospital that offers inpatient services to persons older than 12 years. In addition to diagnostic evaluation, medical and surgical treatment, and nursing care, the following services are provided: physical, occupational, and speech therapy; psychological and vocational testing; sheltered workshop activities; and, if other measures are not feasible, custodial care. Emphasis is placed upon total rehabilitation of the patient.

During the period from July 1, 1954, to July 1, 1955, fifteen persons with cerebral palsy received inpatient care at Highland View Hospital for a total of 4,220 days.

Cerebral Palsy Clinic, University Hospitals (Western Reserve University): The Cerebral Palsy Clinic of University Hospitals is a diagnostic clinic that is operated as a part of the orthopedic outpatient department. Children requiring therapy are referred to the Cleveland Hearing and Speech Center, the Society for Crippled Children's East Side or West Side centers, or to other facilities within the community. At regular intervals these children return to the clinic for recheck examinations.

Between July 1, 1954, and July 1, 1955, thirty-five children with cerebral palsy were examined at the Cerebral Palsy Clinic on 103 occasions, for which charges were made totalling $74.50. Although no figures are available as to actual cost of operation of the Cerebral Palsy Clinic, the cost per visit for all outpatient clinics in University Hospitals during 1954 was $5.04. Therefore, the total cost of diagnostic services to these 35 children can be estimated as $519.12.

Cerebral Palsy Foundation School: The Cerebral Palsy Foundation School provides full-day care five days a week to children with cerebral palsy between the ages of 3 and 10 years. This facility, which has a capacity of 16 children, offers a program of physical, occupational, and speech therapy, and educational activities on nursery and elementary school levels. Lunch is provided for the children. For the period from July 1, 1954, to July 1, 1955, twenty-five children were enrolled in the Cerebral Palsy Foundation School.

Cleveland Rehabilitation Center: The Cleveland Rehabilitation Center provides rehabilitation services on an outpatient basis. In co-operation with the Society for Crippled Children of Cleveland, the Rehabilitation Center provides physical, occupational, and speech therapy, and nursery school training for children with cerebral palsy. In cooperation with U.C.P.A., the Rehabilitation Center evaluates each adult with cerebral palsy in regard to his potential capacity for vocational rehabilitation, and makes available its facilities for group instruction in English and speech and for social and recreational activities including supervised swimming.

For its services from July 1, 1954, to July 1, 1955, the Cleveland Rehabilitation Center received $19,883.40 from the Society for Crippled Children of Cleveland and $3,746.33 from the United Cerebral Palsy Association of

Cuyahoga County. Both of these amounts were listed previously as expenditures of the respective agencies.

Council for the Retarded Child: The Council for the Retarded Child is an agency organized for the purpose of aiding children who are so severely retarded mentally that they are not eligible for admission to public schools. The Council sponsors full-day classes, which meet five days a week, where these children are taught to feed and dress themselves, to take care of their personal needs, to adjust to other children, to use public transportation, and finally after they have acquired these basic abilities, to read and write. Children between 6 and 21 years of age who are ambulatory and toilet-trained, and who are not eligible for public school because of low intelligence (I. Q. less than 50) are admitted to these classes.

Between July 1, 1954, and July 1, 1955, 170 mentally retarded children were enrolled in the 15 opportunity classes throughout Greater Cleveland; of this group, it was estimated that about 10 per cent have mild forms of cerebral palsy. The unofficial estimate of cost for each child for this period is $385.13. The state of Ohio and Cuyahoga County together pay about 44 per cent of expenses of this agency; parents who are able to pay are charged $5 per week.

Ohio State Bureau of Vocational Rehabilitation: The Bureau of Vocational Rehabilitation provides the following services to persons who are handicapped vocationally because of physical or mental impairment: (1) individual vocational testing, counseling, and guidance; (2) medical, surgical, or psychiatric care, and hospitalization, if there is financial need and if such treatment will remove or reduce the disability within a reasonable period of time; (3) artificial limbs, braces, hearing aids, and trusses if such devices might increase work capacity and if there is financial need; and (4) specialized training in schools, colleges, universities, on-the-job apprenticeships, or in any situations that lead to gainful employment, whether or not there is financial need. From July 1, 1954, to July 1, 1955, approximately 16 persons with cerebral palsy residing in Cuyahoga County received services from this bureau.

Table 5: Cost for One Year of Services to Children and Adults with Cerebral Palsy in Greater Cleveland

Program	Cost	Unduplicated Cost
United Cerebral Palsy Association of Cuyahoga County	$102,588.71	$102,588.71
Society for Crippled Children of Cleveland	119,039.46	119,039.46
Cleveland Clinic Diagnostic and Treatment Center for Cerebral Palsy	22,495.36	11,903.82
Cleveland Hearing and Speech Center	8,830.49	643.00
Cleveland Board of Education: Sunbeam School for Crippled Children	60,887.46	60,887.46
Cuyahoga County Welfare Department: Crippled Children's Services	32,063.38	30,667.34
Rose-Mary Home for Crippled Children	24,394.44	13,695.44
Highland View Cuyahoga County Hospital	54,860.00	52,904.04
Cerebral Palsy Clinic, University Hospitals	519.12	519.12
Cerebral Palsy Foundation School	28,671.93	28,671.93
Cleveland Rehabilitation Center	23,629.73	—
Council for the Retarded Child Training Classes	6,547.21	6,547.21
Ohio State Bureau of Vocational Rehabilitation	1,707.00	1,707.00
TOTAL		$429,774.53

Other Services: Undoubtedly a number of children and adults with cerebral palsy were treated by their family physicians and were admitted to various hospitals within the community. Information concerning cost of such services is not available. Probably the amount for any one hospital would not be large. For example, in Cleveland City Hospital fewer than five persons with cerebral palsy received physical therapy during the period under consideration.

Other agencies in Greater Cleveland provide services to a few persons with cerebral palsy. The Cleveland Guidance Center offers psychiatric assistance and guidance in management of children with behavior problems; this agency reports that during the past year only three children with cerebral palsy received such services. The Vocational Guidance Bureau at times gives vocational testing and guidance to persons with cerebral

palsy. Other organizations that also provide services are the Goodwill Industries in its Sheltered Workshop, the Cleveland Public Library in its homebound service, and Para-Progressives, a group of disabled adults who help each other to become more self-sufficient.

Summary

The costs for one year (July 1, 1954, to July 1, 1955) of the major programs in Greater Cleveland providing services to children and adults with cerebral palsy are summarized in table 5. Since there was some duplication of cost, consideration should be given only to the unduplicated cost, which is listed in the right-hand column of table 5. On the basis of this survey, the total cost for the year of all programs in Greater Cleveland is $429,774.53.

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2020 E. 93rd St., Cleveland, Ohio.

Acknowledgment: This study was made possible through the splendid cooperation of the directors and members of all agencies mentioned in this paper.

IMPORTANT ANNOUNCEMENT

American Board of Physical Medicine and Rehabilitation

The next examinations for the American Board of Physical Medicine and Rehabilitation will be held in Chicago, June 16 and 17, 1956. The final date for filing applications is February 1, 1956. Applications for eligibility to the examinations should be mailed to the Secretary, Dr. Earl C. Elkins, 200 1st St., S.W., Rochester, Minn.

Use of Occupational Therapy in Physical Rehabilitation

O. Leonard Huddleston, M.D., Ph.D.
Santa Monica, Calif.

The purpose of this paper is to present my ideas regarding the use of occupational therapy in the physical rehabilitation of patients with neuromuscular disorders and to describe the operation of the occupational therapy service at the California Rehabilitation Center. In my opinion, only functional occupational therapy has any significant use in physical rehabilitation; it may be of primary importance in others. In physical rehabilitation individual occupational therapy and one or more hours of group therapy (four patients to one therapist) may be utilized; in other types of rehabilitation the patient receives only group therapy. In most instances occupational therapy is used as a complemental therapeutic procedure to enhance the neuromuscular re-education provided in physical therapy by the manual resistive exercises.

Occupational therapy is used almost exclusively to improve the functional usage of the upper extremities. However, in some cases, activities may be prescribed to improve sitting and standing balance, or to correct the patient's posture and work habits.

The medical staff is obliged to direct and supervise the activities carried out in the occupational therapy service. The activities do not have to conform necessarily to the experience and training received in occupational therapy schools, but may include other activities that are conventionally included in other ancillary services. It is common sense to employ the services and skills they are most capable of performing, but there is nothing to prevent a physician from either requesting or permitting his occupational therapy staff to carry out certain functional activities that are not customarily regarded as conventional occupational therapy, provided, of course, ample instruction and in-training is provided. There is one point I should like to stress very emphatically — whatever a physician prescribes in occupational therapy, or whatever procedure he recommends, is occupational therapy regardless of what anyone else wishes to label it. It is my belief that there is little need for extensive utilization of diversional therapy, psychological training, and psychotherapy which is emphasized so heavily in some of the occupational therapy training schools. In any busy rehabilitation center, there is little need for activities other than functional occupational therapy.

Objectives and Activities

The objectives of occupational therapy are as follows:

1. To develop and improve gross and fine functional movements of the upper extremities.
2. To increase speed, accuracy, and endurance of neuromuscular activities of the upper extremities.
3. To train patients in self-care activities involving principally the upper extremities.
4. To participate in certain phases of vocational training.
5. To develop power, co-ordination, endurance, motor skills, and functional performance of the upper extremities and to achieve maximal functional recovery.
6. To train patients in the functional use of braces, splints, prostheses, and mechanical assistive devices.

The activities of the occupational therapy service, other than those immediately concerned with the development of maximal function of upper extremities, are: Periodic evaluation of self-care functions and other activities of daily liv-

Read at the Thirty-second Annual Session of the American Congress of Physical Medicine and Rehabilitation, Washington, D. C., September 8, 1954.

Medical Director, California Rehabilitation Center, Santa Monica; Clinical Professor of Physical Medicine, University of Southern California School of Medicine, Los Angeles.

NAME _____ DIAGNOSIS _____

AGE _____ SEX _____ THERAPIST _____

DATE _____

A. Condition of function

1. Bed patient .....
2. Wheelchair patient .....
3. Uses crutches or canes .....
4. Ambulatory without assistance ...

B. Hygiene

1. Comb hair .....
2. Setting hair with pins .....
3. Brush teeth .....
4. Shave or apply make-up .....
5. Wash hands and face in basin ...
6. Take a tub bath .....
7. Take a shower bath .....

C. Dressing

1. Dress .....
2. Undress .....
3. Button buttons .....
4. Tie shoes while on .....
5. Apply and remove braces .....
6. Open purse and get into pockets..

D. Feeding

1. Eat with spoon and/or fork .....
2. Cut meat .....
3. Drink from glass .....
4. Drink from cup .....

E. Hand Activities

1. Use dial telephone .....
2. Manipulate book .....
3. Write .....
4. Wind wrist watch .....
5. Open and close drawers .....
6. Operate light switches .....
7. Pick up object from floor .....
8. Open and close door .....
9. Propel wheelchair .....
10. Use key and lock .....

Patient's signature
(See other side for subsequent signature(s) _____

O — Unable to perform activity — not applicable.
P — Poor: performance partial: requires human assistance but needs improvement.
F — Fair: performed without any human assistance but needs improvement.
G — Good: adequate performance for practical performance but some residual.
N — Normal without residual in bodily segment.
Grade in red — performance practical but relies on others when should not.
Circled grade ○ limited in type. Squared grade □ with mechanical assistance.

Remarks _____

Fig. 1 — Occupational therapy functional activity record of the California Rehabilitation Center.

NAME _____ DIAGNOSIS _____

AGE _____ SEX _____ THERAPIST _____

DATE _____

A. SELF-CARE

(a) Bed Activities

1. Turn over .....
2. Sit up .....
3. Brace application .....
4. Into bed .....
5. Out of bed .....

(b) Wheelchair activities

1. Bed to chair .....
2. Chair to bed .....
3. Chair to floor .....
4. Floor to chair .....
5. Chair to chair .....
6. Chair to standing .....
7. Standing to chair .....
8. Toilet .....
9. Tub .....
10. Wheelchair in and out of car .....
11. Brace application .....

B. GAIT

Mechanical aids used:
H-bars, crutches, X-sticks, canes, prostheses, braces, unaided

(a) Standing Activities

1. Into car .....
2. Out of car .....
3. Down to floor .....
4. Up from floor .....
5. Toilet .....
6. Tub .....
7. Shower .....

(b) Walking Activities

1. Standing balance .....
2. 4-point gait .....
3. 2-point gait .....
4. Swing to .....
5. Swing through .....
6. Forward ____ feet .....
7. Turning .....
8. Uneven surfaces .....
9. Open, pass, close door .....
10. Cross street with signal .....
11. Falling .....
12. Walking endurance .....

(c) Elevation

1. Incline .....
2. Curb .....
3. Stairs, with rails .....
4. Stairs, without rails .....
5. Bus steps .....

O — Unable to perform activity.
P — Poor; partial performance, requires assistance.
F — Fair; performed without assistance.
G — Good; adequate performance but some residual.

N — Normal.
Circled grade F — limited in types.
Squared grade G — with mechanical assistance.

Fig. 2 — Physical therapy functional activity record of the California Rehabilitation Center.

ing; conduction of tests for speed, accuracy, and work tolerance of designated activities; and participation with the vocational rehabilitation service in testing and training patients for specific vocational needs.

The goal to be reached by any patient must, of necessity, be established individually in terms of the diagnosis, physical handicaps, extent of disabilities, prognosis for recovery, as well as the interest, co-operation, and capabilities of the patient. In some cases the goal to be achieved may be that of sufficient recovery to enable the patient to undertake an active vocational training program, necessitating a change of occupation. In other patients, it may be that of obtaining sufficient functional recovery to return to his former occupation. These goals, of course, are established by the physiatrist in charge of the patient's rehabilitation program.

Application of Principles of Neuromuscular Re-Education

I have described the cardinal principles of neuromuscular rehabilitation in another paper.[1] Briefly, they are (1) maximal voluntary effort during isotonic and isometric contraction, (2) reinforcement of voluntary contraction by synaptic facilitation, (3) use of mass movement exercise and primitive motion patterns, (4) repetition, and (5) adequate duration of treatment.

The clinical application of basic physiological principles to the treatment of neuromuscular disorders have been described adequately as applied to physical therapy[2-7] and to occupational therapy.[8-11] The principles of greatest importance, as applied to occupational therapy, are (1) maximal resistive exercises; (2) utilization of myotatic stretch reflexes; (3) use of mass motion patterns, especially the diagonal mass motion patterns, and, to a lesser extent, straight functional patterns; (4) contactual stimulation, and (5) reinforcement of voluntary and reflex activities by synaptic facilitation.

The fifth principle may be accomplished by employing two or more of the other principles either simultaneously or in serial sequence; for example, simultaneous contraction of synergic and fixation muscles of one or both sides of the body by first using isotonic contraction followed by maximal isometric contraction, or by employing the successive induction technics of reversal of antagonists and simultaneous activation of proprioceptive afferents from other parts of the body.

Contactual stimulation,[5, 10] the fourth principle, utilizes tactile and pressure excitation in the receptors of the exteroceptor and proprioceptor system, or combines relatively simple co-ordinated reflexes, such as the extensor thrust and the grasping, reflex with voluntary effort.[10]

The technics for performing some of these activities have been described elsewhere.[3-7]

Participation in Vocational Rehabilitation

Although the chief function of the occupational therapy service is concerned with physical rehabilitation, certain of its activities have a direct bearing on vocational rehabilitation. Evaluation and testing of the functional activities of the upper extremities may be extremely useful in selecting the type of vocational training in which a handicapped individual with inadequate functional control of his upper extremities can be trained. In such cases it is often as important to determine the kind and extent of functional activities the patient cannot do as it is to determine those he can. Figure 1 illustrates the type of functional activity chart used by the occupational therapy service to check the functional activity of a patient; figure 2, the functional activity form used by the physical therapy service. These forms are filled out when a patient is admitted and at periodic intervals thereafter. When there are certain deficiencies in the physical recovery of a patient, specific training in the form of exercises and occupational therapy activities are carried out to achieve specific objectives in order to meet the vocational needs of the patient. Specific tests for speed, accuracy, and endurance of certain vocational needs inherent in the performance of a specific job may be ob-

Fig. 3 — C. R., age 27, diagnosis anterior poliomyelitis, paralytic, convalescent stage, severe. Patient has a complete paralysis of both upper extremities. She is shown typing on an electric typewriter, using a balanced feeder, suitable wrist and finger splint, and a holder, which enables the patient to grip a pencil or other small object which may be used in various self-care activities or in special functional activities such as typing.

tained by the occupational therapy service. Recommendations in training and treatment are provided so that adequate steps may be taken to achieve these objectives.

Integration of Occupational Therapy Activities

At the California Rehabilitation Center the occupational therapy service is an integral part of the rehabilitation team. It contributes its part of the therapeutic activities to the total treatment program and cooperates with other departments and services to co-ordinate various activities. For example, occupational therapy may supplement the treatment and training that a patient with aphasia receives in speech therapy by assisting him to learn to write and to recognize and handle objects of various kinds that are used in the occupational therapy department. The patient may be motivated to talk either directly by working with the therapists, or indirectly by working with the patients in a group so that he is exposed to sympathetic conversations of others. In almost every instance occupational therapy activities complement the neuromuscular re-education and therapeutic exercises provided by the physical therapy service. Likewise, the occupational therapy service is intimately related to the medical staff, the upper extremity brace shop, and the prosthesis clinic in developing proper functional usage of splints and prosthetic devices. The chief occupational therapist is a member of the vocational rehabilitation board. At board meetings accurate evaluation reports are made regarding the progress and functional status of patients reviewed by the board. Its principle interrelations with corrective therapy are concerned with augmenting and assisting in the activities of daily living, which are carried on in physical therapy and in the expansion of the activities of resistive exercises in microgym. When patients recover enough function

of the upper extremities to carry on the microgym exercise program, more or less unassisted, they are transferred to the corrective therapy section where heavier weights, intermediate between those used in occupational therapy, and the pulley weight program may be performed under the supervision and assistance of the corrective therapist.

The activities of the occupational therapy service are also integrated with the nursing service; there is active cooperation between the nurses and the occupational therapists in carrying out some of the self-care activities on the ward. The performance of the activities of the occupational therapist is effected at the bedside before patients have recovered sufficiently to be taken to the occupational therapy department. Even after some of the activities are performed by such patients in the department, additional training and assistance in dressing, hygiene, and feeding themselves may be done on the ward so that self-care is implemented as soon as possible. Another important phase of the occupational therapy service is that of developing a suitable home-treatment program and of providing suitable equipment and apparatus for patients to take home to continue their activities on the home-treatment basis. Instruction and training in the activities to be followed in the home are provided for the patient and members of the family before the patient is discharged. Participation in the formulation of a home-treatment program is included as an important part of the occupational therapy service.

Summary

Only functional occupational therapy has any significant use in physical rehabilitation. It is regarded as complemental neuromuscular re-education involving training in motor patterns. The principles are essentially the same as those employed in physical therapy—maximal voluntary effort exerted against a counteracting resistive force combined with synaptic facilitation technics. The objectives are to develop and improve gross and fine motion patterns; to increase speed, accuracy, and endurance of neuromuscular activities; to train patients in self-care activities; to participate in some vocational training; to evaluate activities of daily living; to test for speed, accuracy, and work tolerance of designated activities; to train patients in the use of upper extremity prostheses, functional splints, braces, and mechanical assistive devices; to participate with the vocational rehabilitation service in testing and training patients for specific vocational needs. Occupational therapy serves as an integral unit of the team approach to physical rehabilitation.

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1815 Ocean Front, Santa Monica, Calif.

AMERICAN ACADEMY OF PHYSICAL MEDICINE AND REHABILITATION

BEN L. BOYNTON, M.D., *President*

COMMITTEE REPORTS

The following reports were presented at the annual business meeting of the American Academy of Physical Medicine and Rehabilitation (formerly American Society of Physical Medicine and Rehabilitation), August 29, 1955, Hotel Statler, Detroit.

By-Laws

At the annual meeting of the American Academy of Physical Medicine and Rehabilitation, the following amendments to the By-Laws were adopted:

ARTICLE I — NAME

The name of this organization is the American Academy of Physical Medicine and Rehabilitation, hereafter referred to as the Academy.

ARTICLE III — MEMBERSHIP

SECTION 2 — ACTIVE MEMBERS

(a) QUALIFICATIONS — To be eligible to be an Active Member, a person must be a member in good standing either of the American Medical Association or of a representative and reputable foreign national medical association and a certificant of the American Board of Physical Medicine and Rehabilitation.

(b) ELECTION — An eligible person may be nominated for active membership by two Active Members, one to act as proposer and the other as seconder, in writing to the chairman of the Membership Committee, supplying such information and executing such application or nomination form as the Committee shall require. At the ensuing annual session, the Committee shall report the names of all nominees received in the preceding year. At the following annual session, the Committee shall report on the qualifications of the nominees and a vote taken thereon. The Committee shall not, however, present any nominee concerning whom it has received, by at least three months prior to the annual session, written objections from ten or more members, which objections, in the opinion of the Committee, are valid objections to membership. The nominees presented by the Committee shall come up in executive session for election or rejection by the membership. A nominee shall be elected on the favorable vote of two-thirds of the members present and voting.

SECTION 3 — SENIOR MEMBERS

(a) QUALIFICATIONS — A person who is sixty-five years of age or more and who has been an Active Member in good standing for fifteen or more years, or since the establishment of the Academy or within two years thereafter is eligible to be a Senior Member. Senior Members are exempt from the payment of dues.

ARTICLE VI — BOARD OF GOVERNORS

SECTION 1 — COMPOSITION

The Board of Governors consists of the President, President-Elect, Vice-President, Secretary-Treasurer, and three elected governors chosen in the manner provided in Article IV of these By-Laws.

SECTION 2 — GENERAL POWERS

The Board of Governors shall carry out the mandates and policies of the Academy as determined by its voting members. Subject only to the provisions of these By-Laws and to all resolutions and enactments of the voting members passed at any executive session of any meeting, regular or special, the Board has full and complete power and authority to perform all acts and to transact all business for and on behalf of the Academy and to manage and conduct all property, affairs, work and activities of the Academy. The Board shall have such other powers and duties as these By-Laws may elsewhere provide and as the Academy may in addition grant or impose.

ARTICLE VIII — FINANCES

SECTION 3

INITIATION FEE AND ANNUAL DUES

An applicant elected as an Active Member shall pay an initiation fee of $50.00. An Active Member shall pay annual dues of $10.00, which are due and payable between January 1 and March 1 of each year. Active Members whose dues are in default at the time of the annual session are subject to such disciplinary measures as the Academy at that time may determine.

ARTICLE IX—OFFICIAL PUBLICATION

The official publication of the Academy is the Archives of Physical Medicine and Rehabilitation, in which shall be published all official Academy notices and transactions of the Academy and of the Board of Governors, either in abstract or in full.

ARTICLE X — DISCIPLINARY ACTION

SECTION 1 — CAUSES

For such reasons and under such conditions as the Academy by resolution may provide, the Academy may enforce proper disciplinary measures on the members. Pending the adoption of such resolution or resolutions, the Academy may admonish, suspend or expel if a member has committeed one or more of the following acts or if one or more of the following acts has occurred:

(a) Default in payment of dues and assessments;
(b) Suspension or expulsion by local medical society;
(c) Suspension or revocation of license to practice medicine;
(d) Violation of the Principles of Medical Ethics; or
(e) Commission of a crime involving moral turpitude.

SECTION 2 — PROCEDURE

Until the Academy by resolution may provide otherwise, no disciplinary action may be enforced unless there has been served by registered mail on the accused member, a copy of the charges against him. The accused member shall not have less than ten days after the service of the charges against him in which to prepare his answer and defense thereto. The accused member shall then be entitled to a hearing before the Board of Governors on such charges and shall be entitled to a full opportunity to be heard. Charges shall be presented in writing to the Board of Governors, who after the hearing referred to, shall recommend appropriate action to the next ensuing annual session. In executive session, the members by a three-fourths vote of those present and voting may affirm, modify or reject the recommendations of the Board of Governors and the decision of the members at such executive session shall be final.

Respectfully submitted,
Earl C. Elkins, *Chairman*
Ben L. Boynton
Miland E. Knapp
Frederic J. Kottke
Donald L. Rose

Liaison with American Hospital Association

This committee has no formal report to make.

Respectfully submitted,
William Bierman, *Chairman*
H. Worley Kendell
Donald J. Erickson

Liaison with Association of American Medical Colleges

This committee has no formal report to make.

Respectfully submitted,
Donald A. Covalt, *Chairman*
Robert L. Bennett
Arthur L. Watkins

Membership

The following persons were elected to membership in the American Academy of Physical Medicine and Rehabilitation on August 29, 1955:

Thomas P. Anderson, Hitchcock Clinic, Hanover, N. H.,
Joseph G. Benton, Institute of Physical Medicine and Rehabilitation, 400 E. 34th St., New York City,
Carrie E. Chapman, VA Hospital, 13th and Harrison Sts., Oakland, Calif.,
John W. Deyton, 628 Oakwood, Webster Groves, Mo.,
Alfred Ebel, 130 W. Kingsbridge Rd., New York City,
Keith C. Keeler, Rehabilitation Center of Summit County, Inc., 326 Locust St., Akron, Ohio,

Myron D. Lecklitner, 401 Belding Ave., Hot Springs, Ark.,
Walter H. Moore, Box 178 — Tripler Army Hospital, APO 438, c/o Postmaster, San Francisco,
Harold Rosenberg, VA Hospital, 1139 Herbert Ave., Salt Lake City,
Robert A. Schlesinger, 806 St. Francis Drive, Broomall, Pa.,
Charles Shields, 5604 Overlea Rd., N. W., Washington, D. C.,
Edward B. Shires, Department of Physical Medicine, University of Kansas School of Medicine, Kansas City, Kans.,
William J. Shriber, 42 Holman Rd., Newtown, Mass.,
Charles Stansky, 6606 Fifth Ave., N., St. Petersburg, Fla.,
Emery K. Stoner, 222 E. Mt. Pleasant Ave., Philadelphia,
Vann S. Taylor, 6222 Northaven Rd., Dallas,
Jerome S. Tobis, 1 E. 105th St., New York City,
George C. Twombly, Jr., Department of Physical Medicine and Rehabilitation, University of Colorado Medical Center, 4200 E. Ninth Ave., Denver,
Eugene H. Weissenberg, VA Hospital, Sheridan, Wyo.,
Col. Clark B. Williams, Chief Physical Medicine Consultant, Office of Surgeon General, USA, Washington, D. C.,
Lawrence H. Wisham, 4414 Cayuga Ave., New York City.

The following persons have submitted applications for active membership in the Academy; they have been found to fulfill the requirements for active membership and their applications have been duly endorsed by a proposer and seconder: Gregory Bard, John Bisgrove, Robert Doman, Bernard Doyle, Ella M. George, Jacob Goldberg, William La Joie, Roy Nyquist, William O'Rourke, Joseph Rogoff, Leo Rosenberg, Frank Schaffer, Andor A. Weiss, and Henry Silverstein. The committee recommends that the names of these nominees be presented for election to active membership at the next annual session to be held in 1956, according to the By-Laws of the Academy, Article II, Section 2(b).

The following persons were elected to honorary membership in the Academy: Basil Kiernander, 30 Weymouth St., London W. 1, England, and A. T. Richardson, The Royal Free Hospital, Gray's Inn Rd., London W. C. 1, England.

The committee also received an application for honorary membership; this application has been previously submitted for review. The committee once again found that the candidate does not qualify for honorary membership under the present By-Laws of the Academy. The committee recognized the candidate's average contribution to the field of Physical Medicine and Rehabilitation, but felt that it cannot recommend honorary membership. The candidate does not qualify for membership under Article III, Section 4(a) of the By-Laws.

The list of persons who have previously applied for membership, but have been found ineligible because they are lacking certain requirements, was read.

The list of persons who have been invited to join the Academy but have not responded to the invitation was read. It is recommended that they be invited once more and then dropped if no response is received. It is also recommended that newly certified diplomates of the American Board of Physical Medicine and Rehabilitation, who are now eligible for membership, be invited to membership.

Resignation of Dr. John J. Hauff was received effective January 5, 1955. It is suggested that the Membership Committee for 1956 investigate Dr. Hauff's eligibility for senior membership. The committee receives with regret notification of th deaths of Dr. Louis Gereb on September 6, 1954, and Dr. Walter M. Solomon on December 30, 1954.

The committee received a communication from the president, dated April 15, 1955, requesting the committee to study the problem of Emeritus Membership as suggested at the meeting of the Board of Governors. The following represents the consensus of the Committee:

a. Emeritus Membership means a membership bestowed on a former active member for a certain reason.
b. According to the By-laws, "a person who is sixty-five years of age or more and who has been an Active Member in good standing for fifteen or more years . . . is eligible to be a Senior Member."
c. A Senior Member is a non dues-paying member with the right to vote.
d. There is no reason to change the denomination of such members.
e. Therefore, the committee does not feel the need for Emeritus Membership except that it could possibly be bestowed on members who do not fulfill the requirements for senior membership, but who cannot afford to pay dues because of hardship, illness, or disability.

Before recommending to discard the suggestion regarding Emeritus Membership, the Committee chairman contacted the president of the Academy in order to find out whether he or the Board of Governors had any other reasons for desiring the study of Emeritus Membership which may not have been apparent to the members of the membership committee. In reply, the president stated that he is in agreement with the foregoing statements, but that he wants the Committee to study the special classification of "Honorary Membership."

This problem had been discussed by the committee members prior to receiving this communication from the president. The following are the recommendations of the Membership Committee.

a. At present, the Academy offers Active, Senior, and Honorary Memberships.
b. The Academy should remain an organization for specialists. If membership, except for the rare bestowing of Honorary Membership, should be opened to others than specialists, the Academy would lose its character and would also compete with the American Congress of Physical Medicine and Rehabilitation.
c. Certification by the American Board of Physical Medicine and Rehabilitation is one of the fundamental prerequisites for Active Membership except for citizens of foreign countries.
d. Membership of citizens of foreign countries who are residing and practicing in a foreign country has been discussed by the Membership Committee. Under the present By-laws, they can be given Honorary Membership. However, it was the consensus of the Committee members that Honorary Membership should be bestowed only for extraordinary achievement. Therefore, the question of giving Active Membership or some other kind of membership to citizens of foreign countries was investigated by the Committee.

(1) As a fundamental prerequisite for any kind of membership the citizen of a foreign country must have training, experience, and professional recognition similar to that of an American physiatrist.

(2) Because such prerequisite could possibly be hard to judge especially in the case of non-english speaking countries it is the suggestion of this Committee that such persons should not be offered Active Membership, but "Corresponding Membership."

(3) A corresponding member should have all rights and privileges of an Active Member except for the right to vote. The dues should be equal to the dues of our Active Members, but no initiation fee should be required. A corresponding member has the right to propose or second the nomination of other applicants for corresponding membership.

e. Senior Membership should be maintained as outlined in the By-Laws. Emeritus Membership is not recommended.
f. Honorary Membership should be bestowed on a person, M.D., or others, whose work in Physical Medicine and Rehabilitation has been so outstanding that he has become renowned nationally or internationally, or to a person who has performed some unusual pioneering work in Physical Medicine and Rehabilitation.
g. Because of the personal and confidential nature of hardship cases, it is the recommendation of this Committee that the Board of Governors — and not the total membership in an open meeting — be empowered to suspend dues and carry the member in question on an active, non dues-paying status until his hardship has ended or until he is entitled to Senior Membership.

In summary the following types of memberships are recommended:

a. Active Membership for Board Diplomates only.
b. Senior Membership for former retired Active Members.
c. Corresponding Membership for citizens of foreign countries, not certified by the American Board of Physical Medicine and Rehabilitation.
d. Honorary Membership for honoring the few real leaders in the field.

Because of recent difficulties in processing applications it is recommended that only those applications received or postmarked on or before June 1 will be presented at the annual meeting of the same year.

The Membership Committee suggests that its recommendations be voted upon by the total membership at this meeting in order to ascertain the wishes of the Academy. It is further suggested that those recommendations which receive the favorable vote of the members be referred to the Committee on By-Laws so that they can be presented as amendments to the By-Laws for final voting according to Article XII of the By-Laws of the Academy.

In closing, the committee desires to express its appreciation and gratitude to Dorothea C. Augustin, Assistant Secretary-Treasurer of the Academy, for her splendid cooperation and help given to the Membership Committee throughout the year.

Respectfully submitted,
Fritz Friedland, *Chairman*
Hans J. Behrend
Robert W. Boyle

Nominating

This committee recommends for nomination the following officers: President, Ben L. Boynton, Chicago; President-Elect, Murray B. Ferderber, Pittsburgh; Vice-President, George D. Wilson, Asheville, N. C.; Secretary-Treasurer, Max K. Newman, Detroit, and Assistant Secretary-Treasurer, Dorothea C. Augustin, Chicago.

We nominate Ralph E. Worden, Columbus, Ohio, and Ray Piaskoski, Wood, Wis., to serve on the Board of Governors. To represent the American Academy of Physical Medicine and Rehabilitation on the American Board of Physical Medicine and Rehabilitation, we nominate Frederic J. Kottke, Minneapolis, and Donald L. Rose, Kansas City, Kans.

Respectfully submitted
Ray Piaskoski, *Chairman*
Morton Hoberman
Arthur C. Jones

Program Committee

The Program Committee, after careful deliberation, selected a group of excellent speakers for the all-day scientific session. The presiding officer for the morning session was Dr. A. B. C. Knudson of Washington, D. C., while the afternoon session was presided over by Dr. Glenn Gullickson, Jr. of Minneapolis, assisted by Dr. Hans J. Behrend, New York City. The session was opened by an address of welcome by Dr. Harold Dinken, President of the American Academy (formerly Society) of Physical Medicine and Rehabilitation. The following papers were presented: "An Evaluation of Some Electrodiagnostic Methods" by Robert W. Boyle, M.D., and Paul A. Dudenhoefer, M.D. "Rapid Mobilization of C.V.A. Patients" by Josephine J. Buchanan, M.D. "The Chronically Ill and Aging—The Physiatrist's Responsibility" by Murray B. Ferderber, M.D.; Raymond F. Smith, M.D., and Saul Machover, M.D. "Disability Evaluation" by Emil J. C. Hildenbrand, M.D. "Recent Progress of Ultrasonic Therapy in Europe" by Dozent Dr. Med. Karlheinz F. Woeber, Bonn (Rhein), Germany. "A Clinic Section of Physical Medicine and Rehabilitation" by Frank H. Krusen, M.D. "Hand Disabilities" by Harriet E. Gillette, M.D. "Afferent Influences in the Management of Spastic Paresis" by Raoul C. Psaki, M.D., and Walter J. Treanor, M.D. Dozent Dr. Med. Karlheinz F. Woeber was the guest speaker. He is Assistant Professor at the University of Bonn, School of Medicine; Hospital for Skin Diseases, Bonn (Rhein), Germany. Dr. Woeber is an outstanding authority on ultrasonic therapy having had many years of clinical experience.

There were no formal discussions prepared for the various papers that were presented. However, there developed a great deal of interesting and stimulating discussions from the floor. The annual scientific session of the Academy was very well attended.

Respectfully submitted,
Louis B. Newman, *Chairman*
Edward M. Krusen, Jr.
Ralph E. Worden

Survey of Economic Status of Physiatrists

Number of physiatrists to whom questionnaires were sent 257
Returned reports 100
(Of these reports 45 were returned by men in Veterans Administration or military service, etc.)
Private offices, plus salary 10
Doctors from hospital or rehabilitation centers 37
Since the data is meager no statistical report is possible.

PRIVATE OFFICES (20)

1. Cost of examination or consultations — $5-$150 .....Average — $10-$20
2. Treatment by therapists .....Average $5
(Therapists' time was not listed routinely. Cost of treatment is by the number of agents or by physical therapist's time, averaging $3.50 to $10. It was not noted as to whether these included physiatrist's supervision or whether a separate office charge was made.)
3. Cost of treatment — $2-$4.50
Average — $3.50
(Some reported by percentage — 45% to 75%)
4. Charge to insurance companies. Five of the 20 charged the same as for other office visits; 2 of the 20 reduced the price; 11 gave no answer.
5. Situation with regard to insurance companies.
Those reporting problems — 5.
Those reporting no problems — 4.
No answer — 11.
In dealing with companies who are caring for private patients, it would seem that the difficulties are slight. Problems arising where industrial coverage is involved:
   A. Low fee supported by state legislation.
   B. Treatment by "doctor" — the type, chiropractor, osteopath, etc., is not important.
   C. Unwillingness to pay for physical therapy in an office.
6. Situation interfering with economic stability:
   A. Private offices of physical therapists.
   B. Subsidized clinics.
   C. Attitude of orthopedists.
   D. Term "Rehabilitation".
   E. General practitioners who equip offices with apparatus.
   F. Suggestions for better economic stability.
      (1) Physical medicine must have its proper place in medical schools where recognition of specialties is established.
      (2) The American Medical Association can be of assistance through its committees, its Council on Medical Education and Hospitals, etc., to support the American Registry of Physical Therapists — to emphasize the necessity of having physiatrists head rehabilitation centers which are receiving federal funds. To insist, as far as posible, that physiatrists direct the activities of departments of physical medicine and rehabilitation in hospitals.
      Though State Medical Societies may recognize the situation with regard to physical therapists in hospitals and in offices, they are not in a good position to take action inasmuch as the problem of keeping recognized physical therapists protected against unrecognized "physical therapists" is their serious problem at the present time.

The American Medical Association may also assist the radiologist, the pathologist and the physiatrist in his struggle with the hospital association so that specialists in this field can be regarded as physicians and not as hospital employees.

(3) Departments of Physical Medicine and Rehabilitation in Hospitals. Many physiatrists are on salary; a few have contracts; some have salary plus a percentage of the gross income of the department. The cost of treatment in hospitals seemingly cannot be broken down. The physiatrist routinely does not know what it costs to give a treatment to a patient. The charge for treatment is routinely low. Dr. D. Alan Sampson, Chairman of the Committee on Hospital Relations and Medical Economics of the Pennsylvania Radiological Society, in his report states that radiologists want to be physicians and to be regarded as such. The facts disclosed are that most of them are hospital employees. Why are they hospital employees? Because it is profitable initially and often for many years. However, this leads to inertia and in turn had led to the practice of radiology in Pennsylvania becoming a hospital service by default. He advises "to overcome this inertia and timidity, arrange that every bill rendered for radiology service has the name of the radiologist on it regardless of whether the bill is sent out by the radiologist or the hospitals, under a system by which the radiologist receives proper credit for all work done, and this must be insisted upon. The hospital will lose its incentive to have radiology included in a Blue Cross per diem."

The physiatrist directing a Department of Physical Medicine and Rehabilitation can be doing not only himself but the physiatrist in a private office harm if he permits the charge for physical therapy, etc., barely to cover the cost of such treatment.

It will be a long time before physiatrists can direct Departments of Physical Medicine and Rehabilitation as they should be directed in the routine local hospitals. The Council on Medical Education and Hospitals of the American Medical Association cannot insist upon this since there are not enough physiatrists at this time to cover the hospitals. A study should be made of contracts, etc., which will enable the physiatrist to practice as a physician in hospitals.

(4) Physiatrists in private practice. Physiatrists should be active physicians in the community. Physical medicine is still a minor specialty. A better understanding should be reached with physicians of the community so that the physiatrist will be recognized as a specialist in his field receiving the respect of the physicians of the community. A physiatrist should not be a coordinator between the physician and the patient, thus doing mass treatment by physical therapists. He should be recognized as a professional colleague. The private patient is the real source of economic stability. Fees should be commensurate with services. The cost of physical therapy to the physician is high, and charges to the patient should be sufficiently high to make this field economically possible. If the treatment received in a physiatrist's office is superior to that received in physical therapists' offices or in the routine Department of Physical Medicine in a hospital, the patient is more than willing to pay the bill. The physiatrist must be a good diagnostician and must be recognized as such by his colleagues.

(5) Physiatrists must organize locally even when the group is small. Such an organization can impress the County Medical Society, the State Medical Society, the insurance companies, and the local physicians. Physiatrists should not fear private practice. Success depends upon the personal interests and personalities of the physician as well as upon the specialty. The physiatrist must be ready to stand upon his own feet in entering the field of Physical Medicine in a community just as every other physician in that community has had to do.

Respectfully submitted,
Frances Baker, *Chairman*
O. Leonard Huddleston
Arthur C. Jones

Physical Medicine Abstracts

Acute Anterior Poliomyelitis and Twinning: Clinical Consideration on Two Pairs of Twins. G. Dadone. Minerva nipiol. (In Italian) **5**:44 (Mar.-April) 1955.

Dizygotic twins, a three-year-old boy and girl, contracted acute anterior poliomyelitis on the same day. As the same groups of muscles in the same extremities were affected by paralysis, it appeared that these patients had a specific constitutional weakness as well as a specific area of sensitivity. In another set of twins, dizygotic brothers, in whom the disease also occurred on the same day, identical groups of muscles were not affected. Both sets of twins had been vaccinated against diptheria and small-pox shortly before the disease developed; however, the paralysis did not occur in the extremity injected as has been reported by many observers in similar instances. Because the author believes that there is a constitutional susceptibility to poliomyelitis, he suggests that prophylactic steps should be initiated for the twin of a patient who contracts the disease. He also recommends that vaccinations should be avoided during an epidemic of poliomyelitis.

Changes in Tissue Clearance of Radioactive Sodium from Skin and Muscle During Heating with Short-Wave Diathermy. J. B. Millard. Ann. Phys. Med. **II(7)**:248 (July) 1955.

The purpose of this experiment was to compare the response of the quadriceps muscle and overlying skin to heating with short wave diathermy; 46 subjects were used.

Five microcuries of Na^{24} chloride in 0.1 to 0.2 ml. of isotonic saline solution were injected at a depth of 2.5 cm. into the quadriceps femoris muscle or into overlying subcutaneous tissue. The rate of clearance of the injected material was recorded by a scintillation counter placed at a fixed distance from the injection site.

Diathermy was applied to the site for 20 minutes by means of a Stanley Cox machine with Bauwens type electrodes. Recording was continued until a final background count was reached. There was a preliminary period of 20 minutes before diathermy was applied.

Tissue clearance was recorded in the opposite leg at the same time in 19 subjects as a control, and skin temperatures were recorded over the injection site with a Cambridge skin thermometer. Deep temperature measurements were made at a depth of 2.5 cm. by means of a needle thermocouple in 6 subjects. The subcutaneous tissue was studied at two sites — one under one of the Bauwens type electrodes and the other half way between the electrodes. The clearance constant K was plotted after the method of Kety.

The skin clearance rate showed an average increase of 70 per cent midway between electrodes and an average increase of approximately 150 per cent under an electrode; 19 of 21 subjects showed an increase.

The muscle clearance rate showed an average increase of 36 per cent. In about one-third of the 25 subjects in this series an increase occurred; in one-third there was little change; and in one-third a decrease was followed by an increase. In the controls, there was an increase in muscle clearance of 2 per cent and an increase in skin clearance of 9 per cent.

There are no raw data concerning age, range of results, or condition of subjects.

Emerging Concept of Poliomyelitis Infection. David Bodian. Science **122**:105 (July 15) 1955.

The author presents the results of a study carried out on two chimpanzees who were fed 50,000 tissue-culture doses of the Wallingford strain of polio virus (type II). They were then sacrificed at ten days. Fecal specimens, throat swabs of the tonsillo-pharyngeal area, and blood specimens were taken daily. After sacrifice, the various tissues were cultured after having been removed as aseptically as possible.

The results show that the primary sources of involvement were the tonsils and the Peyer's patches of the ileum. Since these areas are involved before the virus is found in the blood stream it is presumed that the invasion of the blood stream stems from the two sources mentioned by way of the lymphatics.

From the work mentioned and previous studies by the author, he states that it is during this early phase of viral multiplication in the lymphatic tissue and the early viral spread that the serum antibody response develops. Although the antibody clears the blood of the virus, it develops too late to affect the infection of the central nervous system.

Concerning immunization, it would seem that the presence of antibodies is capable of blocking the invasion of the CNS by the virus. It would also seem that the presence of antibodies would prevent infection of tonsils and Peyer's patches from the hemal route.

The author closes by speculating what effect more inoculations will have on the survival mechanism of this "intestinal virus."

Diagnosis and Prognosis in Aphasia. Hildred Schuell. A.M.A. Arch. Neurol. & Psychiat. **74**:308 (Sept.) 1955.

The author suggests that symptoms of aphasia be considered from two different aspects, first, in relation to three cerebral systems essential in language processes: The auditory, visual, and sensorimotor systems; in relation to the four language modalities in which impairment may be observed; and understanding what is said, speaking, reading, and writing. The relationship between processes involved and functions impaired are subtle and complex, but differential diagnosis is possible and clinically useful.

This is the third publication by this author during the past three years on the problems of aphasia. The first reported clinical findings on 138 aphasic patients, the second on 65, and the present paper presents the results on 56 additional cases. Relatively simple test procedures are presented which have been found helpful in diagnosis and prognosis. These tests were devised for easy performance by adults of average intelligence with elementary school education and have been shown to be sensitive to signs of aphasia.

Recurring patterns of impairment have been observed. These patterns are stable and identifiable by specific diagnostic criteria, and each pattern carries a specific prognosis. They are (1) severe impairment, for which prognosis is poor; (2) impairment of auditory retention and recall (reauditorization), for which prognosis is excellent; (3) impairment of reauditorization with coexisting visual involvement; (4) impairment of reauditorization with coexisting sensorimotor involvement; and (5) generalized brain damage. Prognosis for the last three patterns is progressively poorer than for uncomplicated impairment of reauditorization, but not as poor as for the pattern of severe impairment.

The significant clinical findings for each of these diagnostic groups are presented and the general principles of treatment for each group are indicated.

Clinical Importance of Hypercapnia. E. B. Brown, and J. Miller. Minnesota Med. **38**:9 (Sept.) 1955.

Much has been written concerning anoxia due to decreased alveolar O_2 tension but little is known of the concommitant elevation of alveolar CO_2 tension which may be obtained and its effect on the body.

Draper, et al, demonstrated the rapid rise in alveolar CO_2 concentration in dogs who were apneic for 45 minutes. The blood pH at this time had dropped to 6.78. These animals had been previously stabilized on 100 per cent O_2. The conditions favorable for retention of CO_2 without anoxia are:

1) Inadequate alveolar ventilation; 2) replacement of the nitrogen of the body with O_2; 3) high concentration of O_2 in the air available for movement into the lungs, and 4) patent airway.

These conditions are present in almost all forms of thoracic surgery in which respiration is artificially carried on for the patient. Hypercapnia and the accompanying acidosis are not grossly evident until such time as the patient is returned to the recovery room and is allowed to breathe on his own.

Hypercapnia manifests itself by ventricular fibrillation or cardiac arrest, and circulatory collapse.

These conditions may be prevented by gradually decreasing the CO_2 tension and maintaining blood pressure with sympathomimetic drugs.

Enzymatic Therapy in Diseases of the Chest: Clinical and Cytologic Aspects. Seymour M. Farber; Samuel L. Phass; David A. Wood, and John K. Frost. Lab. Invest. 4:362 (Sept.-Oct.) 1955.

The authors discuss the clinical use of the enzymes streptokinase and streptodornase, which are produced by hemolytic streptococci, and the two pancreatic enzymes, trypsin and desoxyribonuclease. Streptokinase acts chiefly on fibrin but has some effect on other clotting elements. The lysing action of streptodornase is mainly on the desoxyribonucleic-acid complexes (from nucleoproteins) which are largely responsible for the viscosity of purulent exudates. Desoxyribonuclease closely resembles streptodornase in its ability to lyse desoxyribonucleic-acid complexes. Trypsin appears to act more specifically on nonpurulent materials.

The potential value of these enzymes in therapy was very promising and the results of their use in superficial lesions have been good. However, the accumulated clinical experience of the past five years in their intrapleural use has failed to confirm the hopes raised by the pilot studies, and the possibility that such therapy may reopen a bronchopleural fistula makes its use questionable.

The authors previously reported series in which enzymes in aerosol sprays were used in the management of problems of tenacious sputum and inflammatory debris in cases of bronchiectasis, asthma, bronchitis and pulmonary tuberculosis. They found that inhalations of vaporized trypsin alone were not clinically helpful but that there was a significant improvement when desoxyribonuclease, in doses of 2 to 5 mg. daily, was added to the usual doses of trypsin.

Because of the frequency of unfavorable reactions observed with this type of therapy the authors undertook a cytologic study of the sputum of a series of patients receiving enzyme therapy. This paper reports the appearance of greatly increased numbers of metaplastic cells in these patients. Furthermore, these cells were atypical in that their nuclei were abnormally enlarged and hyperchromatic and the cells were frequently multinucleated with irregular and jagged nuclear borders.

In order to evaluate the significance of these cytologic changes the authors performed a series of animal experiments using Heston Strain A mice because of their high predictable incidence of spontaneous pulmonary tumors. In both the control group and those receiving trypsin by aerosol spray pulmonary tumors appeared in approximately the expected percentage, 14 and 17 per cent respectively. However, in those receiving desoxyribonuclease, 41 per cent developed pulmonary tumors, an incidence approximately 2½ times as great as anticipated.

These results are considered extremely interesting, although not necessarily significant in clinical therapy. The series is small but the findings emphasize the need for caution in the use of enzyme therapy.

Analysis and Therapy of Cerebellar Ataxia and Asynergia. Herman Kabat. A.M.A. Arch. Neurol. & Psychiat. 74:375 (Oct.) 1955.

The author reports his observations on the neuromuscular function "in a large series of patients with disease or injury of the cerebellum or its pathways who were under an intensive rehabilitation program."

He has developed the "rhythmic stabilization" test in order to gauge the severity of cerebellar asynergia. In this test the patient holds a joint (such as the wrist) rigid while the examiner alternately and repeatedly applies resistance to the wrist extensors and flexors. The author's hypothesis is that the neocerebellum has as its chief function the facilitation of voluntary isometric contraction and co-contraction. If cerebellar asynergia exists, the implication is that the patient with such involvement cannot stabilize the joint tested against resistance and that he uses isotonic contraction (rebound) rather than isometric. In very severe involvement the joint can be moved through a wide range and the patient fatigues easily.

Specific imbalances of antagonistic muscles exist in both upper and lower extremities. Most characteristic is weakness of the toe flexors and shoulder abductors. This is quite unlike lesions of the corticospinal tract or of the paleostriatum. Weakness of the toe extensors and dorsiflexors of the ankle is more common in the former and that of the abductors of the shoulder is usual in the latter.

Rehabilitation of the patient with cerebellar ataxia and asynergia is based on training in voluntary isometric contraction and co-contraction, correction of weakness of antagonists, and development of endurance.

The author speculates that the neocerebellum facilitates voluntary isometric contraction while the paleostriatum facilitates voluntary isotonic contraction, and that coordination of these opposing systems leads to skilled voluntary movement. Differences in Parkinsonism and cerebellar disease are cited as possible evidence.

Tolerance of Temporary Occlusion of the Thoracic Aorta in Normothermic and Hypothermic Dogs. William M. Parkins; Max Ben, and Harry M. Vars. Surgery 38:38 (July) 1955.

The author's purpose was to determine the effectiveness of hypothermia in the prevention of anoxial damage resulting from temporary occlusion of the thoracic aorta.

The thoracic aorta was occluded by a balloon catheter in the region of the eighth to tenth intervertebral spaces in both normothermic and hypothermic dogs.

In the normothermic series, eight of ten dogs survived following a thirty-minute occlusion. Four of the survivors had hindquarter paralysis. Four of another series of ten dogs survived after a one-hour occlusion. All the survivors suffered hindquarter paralysis. None of five normothermic dogs survived a two-hour occlusion. Methods used to induce hypothemen were surface cooling by means of crushed ice, blood cooling, and visceral cooling. Two of the five dogs surface cooled to a rectal temperature of 30 C. survived following a one-hour occlusion. Cooled to the same rectal temperature by blood chilling, two of another series of five survived the same period of occlusion. Cooled by this latter method to a rectal temperature of 24 C. to 26 C., seven of eleven dogs survived an hour of occlusion. None of these hypothemic animals were paralyzed.

When the viscera was directly cooled by iced saline solution to give a duodenal temperature of 21 C., a series of four dogs survived after one hour of occlusion. There was no paralysis. Five of another series of six dogs survived after a two-hour occlusion when duodenal temperatures were lowered to 10 C. to 20 C. One animal was paralyzed.

When duodenal cooling to 15 C. was delayed until fifteen minutes after the initiation of a two-hour occlusion, all four dogs survived but two developed paralysis. Ordinarily cooling was begun three to ten minutes before occlusion. As a further control, 37 C. saline was substituted for the iced saline. The results

obtained were essentially the same as those for normothermic animals.

In unpublished data, the authors have demonstrated that the liver cooled by refrigerated blood passing through a carotid artery — splenic vein shunt at 18 C. to 20 C. was unsuccessful in protecting four out of five dogs subject to a one-hour aortic occlusion. This implies that cooling the duodenum to a comparable temperature is more effective.

In addition to anoxia of the spinal cord and hypovolemia, it is postulated that bacterial factors and enzymes may play a role in morbidity and mortality. Statistical analysis certainly seems desirable in face of the small number of animals in each series.

Extracellular Hyperosmolarity after Cerebral Lesions. P. Anthonisen; T. Hilden, and A. C. Thomsen. Nord. med. (In Danish) **53**:713 (May 5) 1955.

Forty-six previously published cases of a symptom complex that originates after cerebral injury and that consists of high serum values and slight elimination of chloride and sodium are listed and analyzed. The initiating lesions include contusions, vascular catastrophes, tumors, encephalitis, postoperative sequelae, insulin shock, and sulfathiazol intoxication. Most of the lesions were in the frontal lobes, in the hypophysis-hypothalamus region, or in both of these areas. The hypothesis presented by the authors is that dehydration is caused by a cerebral lesion of the osmoregulating mechanism. This results in reduction of water content and blood volume, which stimulates the normal mechanism for regulating volume and active salt retention. The death rate attributable to the lesions themselves is high, thus it is difficult to evaluate the prognosis. Thirty-three of the patients reported upon died; the fate of two others is still in doubt. It is believed that the magnitude of the shift in electrolyte balance is highly influential as a cause of death. In the 11 patients that survived this symptom complex, the disturbances of osmoregulation generally appeared to be reversible. Treatments of this disturbance reported by various authors included salt-free fluids in most instances. Apparent improvement in one of two patients treated with a mercurial diuretic has been reported. Use of the artificial kidney has been suggested as a possible treatment for some patients.

The Diagnosis of Muscular Dystrophy. Ade T. Milhorat. Am. J. Phys. Med. **34**:103 (Feb.) 1955.

The author's purpose is to delineate the salient features necessary for the diagnosis of muscular dystrophy.

The requirements for diagnosis are a careful history; knowledge of muscular dystrophy and diseases with which it may be confused; careful examination of the patient; and knowledge of test and laboratory procedures and an understanding of their limitations.

The disease is defined as one belonging to a group of mobility disorders characterized by muscle wasting that is not subsequent to any demonstrable disease of the nervous system. Usually the proximal muscle groups are the first involved. In 35 per cent of the cases one may get a history of involvement in another member of the family. The disease attacks children chiefly but no age group is immune.

The course is one of gradual increase in disability which is correlated with muscle wasting. Contractures and emotional factors are ancillary factors.

The pseudohypertrophic form is characterized by muscle wasting with weakness, pseudohypertrophy and contractures. Inheritance of the disease appears to be sex-linked, being transmitted by a normal female to male offspring.

The facioscapulohumeral type is characterized by slowness of progression. Signs of facial involvement may be found in childhood. Usually however, the patient is unaware of any abnormality until puberty. Inheritance is transmitted directly from affected parent to child by a dominant factor.

The disease may be confused with myositis or myotonia atrophica. Physical

signs and symptoms and a biopsy often help to differentiate these diseases. In extensive wasting, creatine excretion in the urine may be increased and creatinine may be decreased.

The author emphasizes that there is no specific laboratory test for muscular dystrophy.

The Physiology of the Aging Process in the Musculoskeletal Apparatus. E. M. Bick. Geriatrics **10**:274 (June) 1955.

This study is concerned with the physiologic processes that result in musculoskeletal disabilities in the aged. Most of these disabilities are tissue responses to metabolic or endocrine changes that can be considered as representing failure of the weakened tissues to withstand normal stresses and strains. Cartilage is the most stable and contributes least to dysfunction of the musculoskeletal system. The chief physiologic problem of orthopedic geriatrics is synthesis of bone protein. Normal and reparative osteogenesis take place by ossification and calcification. A disturbance in production or vascular distribution of chemical elements upsets the balance between these processes. Skeletal deformities result, mostly because of collapse of soft and brittle bone at points of major stress. Failure of the muscular system is most often caused by deterioration of the circulatory mechanisms or the central nervous system. Orthopedic defects in the aged will be largely prevented when failing osteogenesis can be controlled.

The Physiological Mechanism of Referred Shoulder — Tip Pain. F. S. Doran, and A. Hall Ratcliffe. Brain **77**:427 (Sept.) 1954.

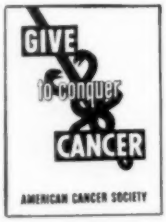
The authors offer a new view of the age old problem of "referred pain." The ideas of the "central" group and their modifications first proposed by John Hunter are discussed as are the feelings of the "peripheral" group.

In order to test both, local anesthesia is used to wipe out superficial sensation in the area supplied by the 3rd and 4th cervical nerves. The phrenic nerve was then exposed and stimulated with resultant sharp pain being elicited over the "shoulder tip" area. The authors state that this proves conclusively that the autonomic nervous system plays no part in "shoulder tip" pain and that the constant flow of subliminal impulses from the shoulder area to a common pool also is not part of the mechanism involved.

The phrenic nerve is directed and the number of fibers 3-6 microns in diameter is measured. Fibers of this size are compatible with those fibers which carry pain impulses. Up to 1762 fibers of this diameter were noted in one phrenic nerve. Therefore, the phrenic nerve, anatomically, is capable of transmitting pain impulses.

There is also some experimental evidence to indicate that some summation of impulses does take place in that anesthetizing the painful shoulder area would tend to decrease the pain on subsequent stimulation.

The authors conclude that impulses from the shoulder and diaphragm terminate in a common group of spinal cord neurones but that their summation is not necessary for producing pain. Pain is felt in the "shoulder tip" area only because the "shoulder tip" has distinct cerebral representation whereas the diaphragm has none.



RICHARD KOVACS MEMORIAL FELLOWSHIP FUND

Applications for assistance from the Richard Kovacs Memorial Fellowship Fund are now being received. The purpose of the fund is to help defray the expenses of one or two qualified persons wishing to attend the Second International Congress of Physical Medicine, August 20-24, 1956, Copenhagen, Denmark.

Letters of application should be directed to the Richard Kovacs Memorial Fellowship Fund Committee, American Congress of Physical Medicine and Rehabilitation, 30 N. Michigan Ave., Chicago 2, Ill.

Applications must be received no later than March 1, 1956.

Medical News

Members are invited to send to this office items of news of general interest, for example, those relating to society activities, new hospitals, education, etc. Programs should be received at least six weeks before the date of meeting.

FRANK H. KRUSEN SUCCEEDS LORD HORDER

The International Federation of Physical Medicine has elected Dr. Frank H. Krusen president to succeed the late Lord Horder. Dr. Krusen was chosen from among six vice presidents of the previous Congress. He will preside at the 1956 meeting to be held in Copenhagen, Denmark.

Fellowship in Physical Medicine

A three-year fellowship in physical medicine is available in an A.M.A.-approved program at the Grace-New Haven Hospital and Yale University School of Medicine, New Haven. For information, write to Dr. Thomas F. Hines, Director, Department of Physical Medicine and Rehabilitation, 789 Howard Ave., New Haven.

Applicants for Congress Membership

Nadene Coyne, M.D., City Hospital, 3395 Scranton Rd., Cleveland: Sponsored by Walter J. Zeiter, M.D., Cleveland.

Victor Cummings, M.D., Montefiore Hospital, Bronx, N. Y.: Sponsored by Karl Harpuder, M.D., New York.

Orlando M. Fontes, M.D., Dept. of Physical Medicine and Rehabilitation, Bellevue Medical Center, 477 First Ave., New York 16: Sponsored by Bruce B. Grynbaum, M.D., New York.

Karl H. Haase, M.D., VA Center, Los Angeles: Sponsored by Elizabeth Austin, M.D., Los Angeles.

W. Kenneth Lane, M.D., National Foundation for Infantile Paralysis, Inc., 120 Broadway, New York 5: Sponsored by Howard A. Rusk, M.D., New York.

Justus F. Lehmann, M.D., 2081 Harwitch Rd., Columbus, Ohio: Sponsored by Earl C. Elkins, M.D., Rochester, Minn.

Kurt George Leichtentritt, M.D., 2295 Grand Concourse, New York 53: Sponsored by Karl Harpuder, M.D., New York.

Isidore I. Neistadt, M.D., 114 Du Bois Ave., Valley Stream, N. Y.: Sponsored by Herbert S. Whiting, M.D., New Hyde Park, L. I., N. Y.

Robert Lloyd Smith, M.D., 1625 Stanford St., Santa Monica, Calif.: Sponsored by Robert Miller, M.D., Los Angeles.

Assistance Grants Established To Aid Young Physicians

The Sears-Roebuck Foundation in cooperation with the AMA has recently established assistance grants to help young physicians who lack capital and business "know-how" in setting up practices.

The plan, especially planned for small or medium sized towns or rural communities, will offer unsecured ten year loans up to $25,000 to physicians unable to get full local financing.

A medical advisory board appointed from nominations by the AMA Board of Trustees will screen all applicants. Each applicant must submit information about the area where he intends to locate.

Physicians wishing to apply for assistance should send applications to the office of the region in which the proposed medical practice is to be established. Address applications to the Director, Sears-Roebuck Board at these locations: Pacific Coast Region—2650 Olympia Blvd., Los Angeles 54; Southwestern — 1409 South Lamar St., Dallas 2; Midwest—8 E. Congress St., Chicago 5; South — 675 Ponce de Leon Ave., Atlanta; East — 4640 Roosevelt Blvd., Philadelphia 32.

Recent Publications by Members

Harriet E. Gillette, "What is Expected of Physical Medicine." Editorial in Journal of The Medical Association of Georgia, September, 1955.

Frank H. Krusen, "The Team Approach to Rehabilitation of the Disabled." Proceedings of the Staff Meetings of the Mayo Clinic, September 7, 1955.

Samuel G. Feuer and co-author, "A Rational Approach of Physical Medicine and Rehabilitation in the Low Back Problem." Compensation Medicine, March-May, 1955.

Leslie Blau, "Contributions of the Doctor of Physical Medicine as a Hospital Diagnostician." The Journal of The American Medical Association, October 8, 1955.

A. Ray Dawson and co-author, "Placement of Rehabilitated Patients." The Journal of The American Medical Association, October 8, 1955.

Edward M. Krusen, Jr., "Pain in the Neck and Shoulder, Commoa Causes and Response to Therapy." The Journal of The American Medical Association, November 26, 1955.

Gordon M. Martin and co-author, "Further Evaluation of Heating by Microwaves and by Infrared as Used Clinically." The Journal of The American Medical Association, November 26, 1955.

William H. Schmidt, "Importance of Diagnostic Methods in Physical Medicine." The Journal of The American Medical Association, November 19, 1955.

Eugene H. Weissenberg and co-author, "A Colostomy Irrigator of Improved Design." The Journal of The American Medical Association, November 19, 1955.

Home Care Program Films

A half-hour film describing the operation of hospital home care programs for patients with chronic disease has been produced by the Benjamin Rosenthal Foundation of New York. Copies of the film are now available at print cost to hospitals, health and welfare agencies or individuals interested in the subject.

The film was produced as a public service to stimulate discussion among hospital, medical, health and other community leaders who are concerned with the problems of chronic disease and the best method of providing the care and treatment of patients with long-term illness.

A discussion guide accompanies the film to clarify many of the points touched upon in the film and contains detailed information on methods and procedures in the creation of a home care program for a hospital or a community.

The film is based upon the experience of Montefiore Hospital in New York City, which instituted its home care program in 1947. Since then, several score hospitals in all parts

of the country have instituted home care programs of their own, with many variations to suit their own needs and resources. The discussion guide includes a chart listing many of these hospitals indicating the variations of services provided by their home care programs.

Home care is an effective method of bringing hospital-type care into a patient's home with the full complement of medical, nursing and social service. The film shows the effects of such care on patients with cancer, heart disease, asthma, arthritis and other chronic conditions.

The film also describes the factors which go into the selection of patients for treatment in a home care program. In addition it shows the role of the doctor, nurse and social worker and the members of every other profession which participates in a home care program.

Also described in the film are the values of a home care program from the viewpoint of hospital administration and the results of such care on a patient's physical and emotional well being.

The film is available from the Health and Welfare Materials Center, 10 E. 44th Street, New York City. It may be rented for $10 or purchased for $50. Rental prices may also be applied toward the purchase cost. Copies of the discussion guide which accompany the film are sent free of charge for each member of the audience.

The American Public Health Association

The Executive Board of the American Public Health Association announces that the 84th annual meeting of the A.P.H.A. and related organizations will be held in Atlantic City, N. J., November 12 to 16, 1956. Headquarters will be Convention Hall.

Special Announcement

The *Bulletin on Current Literature*, published since 1940 by the Library of the National Society for Crippled Children and Adults, has changed its title to *Rehabilitation Literature*, beginning with the January 1956 issue.

The new name will identify better the subject coverage of the monthly bibliographic bulletin, which will continue to index and abstract not only medical and therapy literature but also the current periodical articles, pamphlets and books in the other professional areas of special education, psychology, social welfare, and employment as relating to the rehabilitation of handicapped children and adults. As an Easter Seal Society service, *Rehabilitation Literature* will continue to be published monthly.

American Academy for Cerebral Palsy Elects Officers

At the October, 1955, meeting of the American Academy for Cerebral Palsy in Memphis, Tenn., the following officers were elected: President, Dr. Margaret Jones, University of California Medical Center, Los Angeles; President-Elect, Dr. Nicholson J. Eastman, Johns Hopkins Hospital, Baltimore, and Secretary-Treasurer, Dr. Robert A. Knight, 869 Madison Ave., Memphis, Tenn.

Demonstration of The Clinical Management of Poliomyelitis

Baylor University College of Medicine, Southwestern Poliomyelitis Respiratory Center and Jefferson Davis Hospital in cooperation with the National Foundation for Infantile Paralysis, Inc., announce a three-day and two evening postgraduate course on the clinical management of poliomyelitis.

The course is designed for physicians, nurses, medical social service workers, physical and occupational therapists to cover complete care of poliomyelitis with emphasis on the severely involved patient, the physician's responsibility in the effective coordination of auxiliary services and the value of comprehensive care.

Dates: February 27, 28, 29 and March 1 and 2, 1956.

Tuition: $8.50 (to accompany application); syllabus will be furnished.

Accommodations: To be arranged by the individual.

Applications:

William A. Spencer, M.D., Medical Director
Southwestern Poliomyelitis Respiratory Center
Jefferson Davis Hospital
1801 Buffalo Drive
Houston 3, Texas.

Number:

Preference will be given to personnel who are or will be directly concerned with poliomyelitis patient management.

A selected number of nurses, physical and occupational therapists may arrange to stay two weeks or one month for additional work in their particular area of interest.

Financial Assistance:

Physicians and nurses requesting financial assistance for this course may apply to their local chapter of the National Foundation for Infantile Paralysis, Inc. All medical social workers, physical and occupational therapists, and any physicians and nurses whose professional responsibilities cover more than the local area should direct inquiries to the Division of Professional Education, The National Foundation for Infantile Paralysis, Inc., 120 Broadway, New York 5. Completed applications must be received by the New York office six weeks prior to the course.

In Memoriam

Bert A. Treister, M.D., University Heights; Western Reserve University School of Medicine, 1932; aged 46; died September 21; member of the Ohio State Medical Association; American Academy of Physical Medicine and Rehabilitation, American Congress of Physical Medicine and Rehabilitation and diplomate of American Board of Physical Medi-

cine and Rehabilitation. A practicing physician in the Cleveland area, Dr. Treister was chief of the physical medicine and rehabilitation at St. Vincent Charity Hospital and at Cuyahoga County Nursing Home. During World War II, Dr. Treister served as a captain in the Army Medical Corps. Surviving are his widow, three sons, five sisters and three brothers.

The American Institute of Dental Medicine Case History Service

The Institute continues to offer case histories from the broad field of dental medicine for the year 1955-56. These will include original 35 mm. Kodachrome slides of the oral condition, pertinent laboratory findings, medical background, roentgenograms, histologic slides, photomicrographs, diagnostic criteria and whatever else may be indicated in each individual case. A loose leaf binder and matching Kodachrome slide box will be furnished each participant.

For further information address all communications to the Secretary, Mrs. C. Novembri, 2240 Channing Way, Berkeley 4, Calif.

American College of Surgeons Sectional Meeting

Handling of mass casualties will be one of the important subjects to be discussed by a panel of experts at the Sectional Meeting of the American College of Surgeons during the three-day meeting in Milwaukee, February 27 through 29, 1956, at the Hotel Schroeder. All members of the medical profession are invited to attend. Dr. Forrester W. Raine, Milwaukee, is Chairman of the Advisory Committee on Arrangements.

Among the topics to be considered are fractures in children, hypothermia in cardiac and general surgery, carcinoma of the prostate, tumors of the thyroid, cancer of the colon, intestinal obstruction, problems in operability, endometriosis, repair of nasal defects, and biliary tract surgery. Special hospital clinics will be offered on two mornings of this meeting. Medical motion pictures and cineclinic films will also be included in the program.

Newly Registered Therapists

November 16, 1955

Abbot, William Y., Jr., Vine St., Trailerest Park, Middletown, Pa.
Arnot, Carole L., 1038 Terrace Ave., Wyomissing, Pa.
Ayers, Barbara C., 615 Beechwood Ave., West Allenhurst, N. J.
Breding, Dorothea M., 208 Hickman St., Rehoboth Beach, Del.
Clark, Jimmy Lee, 3002 20th St., Tampa, Fla.
Closs, Nancy Rowe, 2931 Island Trail, Box 297, Sparta, N. J.
Cypres, Robert M., 100 Price St., West Chester, Pa.
Daniel, Alfred N., 411 Jefferson Ave., Bristol, Pa.
DeCinque, Benjamin J., 119 E. Main St., Penns Grove, N. J.
DeMaria, Dorothy, Point St., Saltsburg, Pa.
Dobishinsky, Helaine M., RD 134, Olyphant, Pa.
Dudeck, Joseph, 13 E. Diamond Ave., Hazleton, Pa.
Duff, John M., Sr., 5611 Whitby Ave., Philadelphia
Evosevich, Marta, 52 S. 10th St., Pittsburgh
Fleming, Robert J., 451 W. 35th St., Los Angeles
Garrett, Betty L., 232 Late Ave., Bridgeport, W. Va.
Haltom, Estelle Jan, 113 N. Tennessee Ave., Martinsburg, W. Va.
Heckman, Patricia Ann, 7 Guyton St., Easton, Pa.
Hemphill, Helen F., 3005 Fourth Ave., Altoona, Pa.
Holyoak, Zephia Fay, 91 W. Center St., Moab, Utah
Johnson, Forrest N., 152 Park Ave., Long Beach, Calif.
Kelly, Margaret M., 200 Main St., Phoenixville, Pa.
Kennedy, Ned R., Jr., 616 N. Prieur St., New Orleans
Kenworthy, Elwood L., 924 W. 34th St., Los Angeles
Kerr, Robert E., 926 S. Osage Ave., Inglewood, Calif.
Kingett, Janet E., 113 S. White Horse Pike, Laurel Springs, RFD, N. J.
Loomis, Wilmer F., Jr., 2610 Summit Ave., Broomall, Pa.
Martiel, Dixie J., 7020 Woodward Ave., Bell, Calif.
Nelson, Merle Janice, 230 Kieth Ave., Missoula, Mont.
Oshins, Natalie B., 1711 President St., Brooklyn, N. Y.
Otte, Edna Mae, RR 1, Oostburg, Wis.
Pechtl, Patricia J., 336 S. 10th St., El Centro, Calif.
Reece, William, Jr., 1604 N. Grape Ave., Compton, Calif.
Reiff, Kathleen Ann, 814 Centre St., Ashland, Pa.
Rhoads, William E., 3443 Edmondson Ave., Baltimore, Md.
Robinson, Donna Jean, 4419 Ramsdell, La Crescenta, Calif.
Saffren, Sheldon, 1440 Levick St., Philadelphia
Shipley, Donald E., 401 Race St., Millville, N. J.
Sulsona, Miguel A., 915 W. 53rd St., Los Angeles
Turner, Patricia Ann, 1111 Broadway, Haverhill, Mass.
Walter, Joseph E., Box 77029, D Station, Los Angeles
Wayne, Juliana, 3805 Spruce St., Philadelphia
Winchell, Frances Rae, 200 S. Hickory St., Mt. Carmel, Pa.
Wood, Charles F., 816 E. Stafford St., Philadelphia
Xanthakis, Christie J., 1017 Teri Ave., Torance, Calif.

November 17, 1955

Andrews, Nadine J., 817 Douglas Ave., Des Moines, Iowa
Ase, Pauline S., 2323 W. Fullerton Ave., Chicago

Barnes, Richard R., Griswold, Iowa
Blackmore, Grace G., 32 Soco St., Asheville, N. C.
Boklander, S. Diane, 1955 8th Ave., S. E., Cedar Rapids, Iowa
Botwinis, Gladys M., 308 13th St., N. W., Albuquerque, N. M.
Burnett, Carolyn N., 1730 W. 105th Pl., Chicago
Clausen, Donna L., 615 Fremont, Laramie, Wyo.
Collins, Ernestine R., 244 Palmetto St., Hot Springs, Ark.
Cressy, Jean F., 93 Falmouth St., Portland, Me.
Ehlers, Shirley Jean, 2312 W. 59th St., Chicago
Elmer, Charles D., R. No. 3, Springdale, Ark.
Faigenbaum, Arlene D., 67 Mt. Pleasant Ave., Troy, N. Y.
Foundas, John C., 601 Finkbine Pk., Iowa City
Graf, Paula L., 806 Hamilton Cleves Pike, Hamilton, Ohio
Hamilton, George F., 3929 McClure Ave., Pittsburgh
Hanzo, Mary Agnes, 3900 S. W. 60th Ave., Miami, Fla.
Harris, Valerie E., 3706 Luxberry Ave., Wantagh, L. I., N. Y.
Hollar, Frank H., 1810 W. 19th St., Sioux City, Iowa
Holmquist, Janet, 715 N. Thomas Ave., Oakland, Neb.
Hultgren, Clarence W., 1965 River Rd., Eugene, Ore.
Jennings, Carol, 9436 Harding Ave., Evanston, Ill.
Kilar, Louise J., 192 Elm St., Masury, Ohio
King, Charles G., 2135 N. 77th Ct., Elmwood Park, Ill.
Knickerbocker, Fay Ann, 331 E. Washington, St., Gainesville, Ga.
Kunze, Minerva Jane, 505 N. Hamilton St., Leaksville, N. C.
Martino, Samuel, 4215 W. Fullerton Ave., Chicago
Mastrovich, Chris J., 107½ Spark Ave., Lead, S. D.
McCreary, Willa Mae, 2420 Maple, Omaha, Neb.
McQuilkin, Diane, 1664 Lewis Dr., Lakewood, Ohio
Miller, Sr. M. Rita, 1121 N. Orleans St., Chicago
Okita, Ted Y., 1026 George St., Chicago, Ill.
Ott, Marilyn Jean, 118 Cherokee Dr., Dubuque, Iowa
Pugh, Larry W., RR 2, Montezuma, Iowa
Smith, Robert E., c/o Horace L. Scott, Cambridge, Iowa
Sperry, Willard Lee, 521 Pine St., Crookston, Minn.
Stanislav, Patricia Ellen, 1233 Morningside Ave., Sioux City, Iowa
Stockmeyer, Shirley Ann, Castle Heights & Midland Ave., Nyack, N. Y.
Sutton, Julius O., 1813 Darrow Ave., Evanston, Ill.
Taylor, Betty M., 61 E. Goethe St., Chicago
Tokarz, Norbert M., 1913 N. Leavitt St., Chicago
Vann, Martha Jane, Boston, Ga.
Wales, Helen Mae, E. Oregon St., Polo, Ill.
Ziadie, Yvonne T., 2 Argyle Rd., Half-Way Tree, Jamaica, B. W. I.

November 22, 1955

Arnold, George M., 146 E. Highland Rd., Johnson City, Tenn.
Artman, Patricia Ann, Mt. Hope, Kans.
Bell, Otho W., Jr., PO Box 117, Irwinton, Ga.
Burk, Dorothy H., 3729 N. Lowell Ave., Chicago
Burnet, Ann R., 1514 St. Mary's Dr., Waycross, Ga.
Chiringas, Percy, 1422 Buchanan St., N. W., Washington, D. C.
Clark, Gwendolyn R., 1614 W. Market St., Greensboro, N. C.
Clay, Curtis A., Box, Lockhart, Fla.
Clayton, Max L., Glasco, Kans.
Elam, Billy Dean, 1914 Olathe Blvd., Kansas City, Kans.
Galford, Hubert R., PO Box 176, Marlinton, W. Va.
Gray, Ruth C., 721 Bell Ave., Birmingham, Ala.
Harger, Frank H., 130 S. Franklin St., Richwood, Ohio
Holleman, Jane B., 804 Stonewall St., Dublin, Ga.
Kirk, Harry W., 4414 Hewitt Ave., Silver Spring, Md.
Laughlin, Lilah Jean, Rt. 1, Tonganoxie, Kans.
Lee, Richard L., 4 Bell Terr., Stroudsburg, Pa.
Lorch, Iris S., 3502 Wakeland, Shreveport, La.
Marnett, Paul J., 925 Sandusky Ave., Kansas City, Kans.
Neate, Mary M., PT Dept., Morris Memorial Hospital, Milton, W. Va.
Nitz, Jack D., 6700 E. 58th St., Kansas City, Mo.
Paglialunea, Dominic C., Box 152, Fairpoint, Ohio
Ralston, Patricia R., 702 Lincoln Ave., Minot, N. D.
Scales, Eloise I., c/o Henry Feuerborn, Box 152, Richmond, Kans.
Smith, Betty Jean, Rt. 1, Ridgeville, S. C.
Smith, Marialice C., 333 Broadway Ave., Shawinagan Falls, Que., Can.
Smith, Zella Anne, Poquoson, Va.
Spittle, Chester H., 18 Rosecrest Ave., Alexandria, Va.
Totten, Edward D., c/o Mr. K. H. Montague, Peach Creek, W. Va.
Vildzius, Margaret B., 8400 Old Georgetown Rd., Bethesda, Md.
Wereb, Rose Mary, Wilson Mills Rd., Chesterland, Ohio
White, Rosemarie S., RFD 2, Ivor, Va.
Wood, Phyllis C., 411 N. Washington, Council Grove, Kans.

Chest Physicians to Meet in Germany Next Summer

The Council on International Affairs of the American College of Chest Physicians has announced that the Fourth International Congress on Diseases of the Chest will be held in Cologne, Germany, August 19-23, 1956. Professor Gerhard Domagk, discoverer of the sulfonamides and Nobel Prize winner, will be president of the World Congress. Additional information may be obtained from the American College of Chest Physicians, 112 E. Chestnut St., Chicago 11, Ill.

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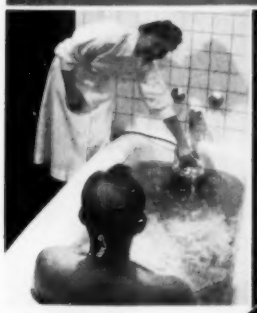

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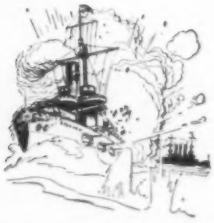

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• The Clinical Approach to Prosthesis •

The Clinical Approach at the Woodrow Wilson Rehabilitation Center, Fishersville, Virginia, features the Clinical Team — the **Orthopedist,** the **Prosthetic Technician** (a HANGER Certified Prosthetist), the **Physical Therapist,** and the **Occupational Therapist** (for arm amputees only).

All amputee patients are examined by this Clinical Team with the complete medical history and other records at hand. During the examination the patient is analyzed as an individual case with his particular advantages and limitations evaluated in relation to the possible courses of treatment. For example whether

a particular stump or joint condition can be corrected with therapy, or with special prosthesis fitting and construction; if not, is further surgery desirable. Then a course of rehabilitation is prescribed by the Orthopedist, including the Physical (and Occupational for arm amputees) Therapy necessary, the type of Prosthesis to be worn, and other special treatment or training required.

Immediately the patient's treatment by the Center begins according to the Prescription. The patient receives pre-prosthetic therapy in which the stump is conditioned to provide the most efficient use of the Prosthesis. He is supervised and treated in baths, heat, exercise, etc., by therapists and nurses specially-trained for this work.

When the patient actually begins to wear the prosthesis, the Clinical Team again works closely together in the rehabilitation program. The Prosthesis itself has been fabricated according to the measurements and specifications taken by the Prosthetist member of the Clinical Team. Careful attention is now given to fitting adjustments, continued therapy, and training exercises, such as walking, sitting, steps, etc. Unusual problems are cause for a complete review and possible change of prescription. For arm amputees. Occupational Therapy now becomes important, and the amputee spends part of each day learning to use the Prosthesis and to live an independent life. Trained therapists and nurses supervise the teaching of dexterity and manipulation through blocks, games, doorknobs, faucets, tools, etc.

Most patients are ready for discharge in about six weeks. Each must appear at the Clinic for a final Prosthetic Performance Check-out by the Clinical Team and Official release by the Orthopedist.

This is one of many such Centers throughout the country where HANGER Technicians function as integral members of the Clinical Team. Each is an ABC Certified Prosthetist, and trained in Team rehabilitation. Feel free to call on any HANGER office for service at any time.

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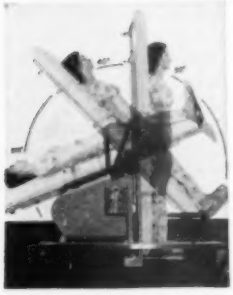

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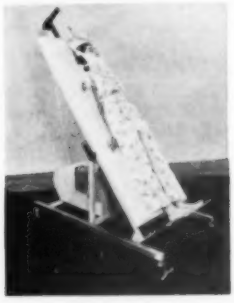

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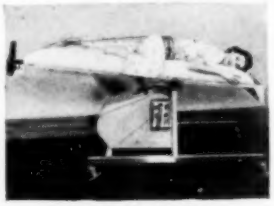

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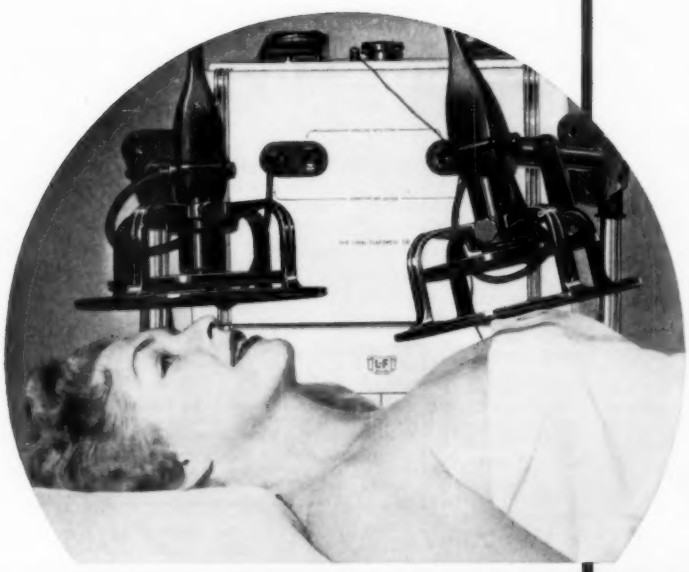

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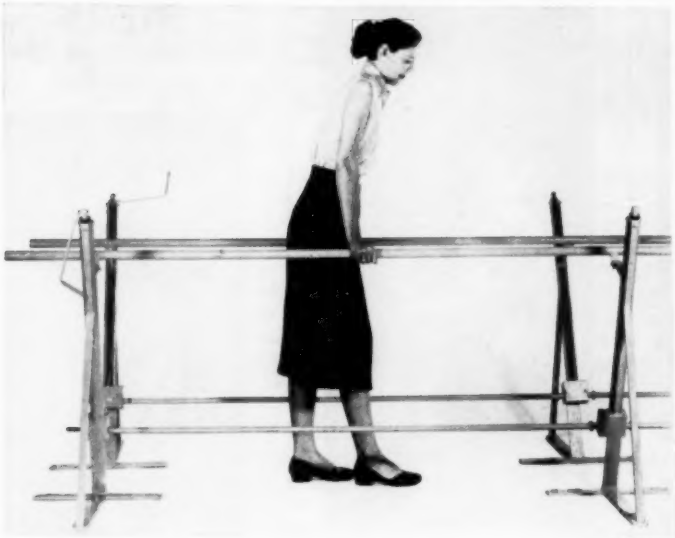

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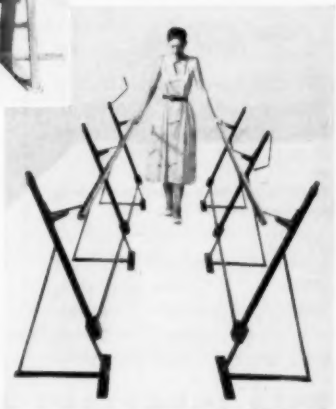

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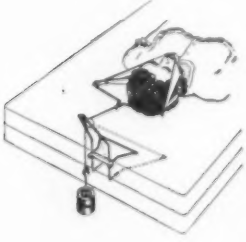

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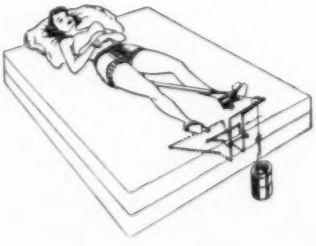

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To stimulate interest in the field of physical medicine and rehabilitation, the American Congress of Physical Medicine and Rehabilitation will award annually, a prize for an essay on any subject relating to physical medicine and rehabilitation. The contest, while open to anyone, is primarily directed to medical students, interns, residents, graduate students in the pre-clinical sciences and graduate students in physical medicine and rehabilitation. The Prize Lecture Committee suggests that members of the American Congress and American Academy of Physical Medicine and Rehabilitation bring this announcement to the attention of interested persons. The following rules and regulations apply to the contest:

1. Any subject of interest or pertaining to the field of physical medicine and rehabilitation may be submitted.

2. Manuscripts **must be** in the office of the American Congress of Physical Medicine and Rehabilitation, 30 N. Michigan Ave., Chicago 2, not later than June 1, 1956.

3. Contributions will be accepted from medical students, interns, residents, graduate students in the pre-clinical sciences, and graduate students in physical medicine and rehabilitation.

4. The essay must not have been published previously.

5. The American Congress of Physical Medicine and Rehabilitation shall have the exclusive right to publish the winning essay in its official journal, the ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION.

6. Manuscripts must not exceed 3000 words (exclusive of headings, references, legends for cuts, tables, etc.), and the number of words should be stated on the title page. An original and one carbon copy of the manuscript must be submitted.

7. The winner shall receive a cash award of $200, a gold medal properly engraved, a certificate of award and an invitation to present the contribution at the 34th Annual Session of the American Congress of Physical Medicine and Rehabilitation at The Ambassador, Atlantic City, N. J., September 9-14, 1956.

8. The winners shall be determined by the Prize Lecture Committee composed of four members of the American Congress of Physical Medicine and Rehabilitation.

9. All manuscripts will be returned as soon as possible after the name of the winner is announced.

10. The American Congress of Physical Medicine and Rehabilitation reserves the right to make no award if, in the judgment of the Prize Lecture Committee, no contribution is acceptable. The Congress may also award certificates of merit to contributors whose essays may be considered second and third best submitted. Announcement of the winner will be made after the annual meeting.

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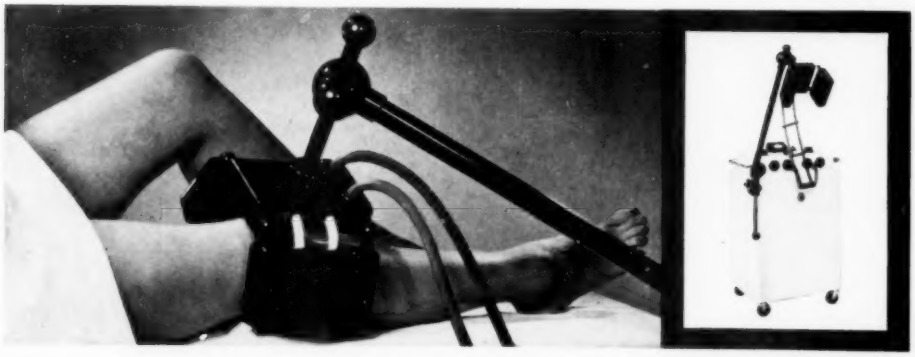

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